Classification Changed to: UNCLASSIFIED
Authorized by: DD 254 Date: 6/10/60
Reclassified by: PCB Dept 11 Date: 8/11/60

Unclassified

REPORT NO. ZD-041

PRELIMINARY MODEL SPECIFICATION
FOR
INTERCEPTOR FIGHTER AIRPLANE
UNITED STATES AIR FORCE
PROJECT MX-1554

DATED 29 DECEMBER 1950

CONVAIR

CONSOLIDATED VULTEE AIRCRAFT CORPORATION

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ANALYSIS
PREPARED BY
CHECKED BY
REVISE [redacted]

CONSOLIDATED VULTEE AIRCRAFT CORPORATION
SAN DIEGO DIVISION

PAGE
REPORT NO. ZD-041
MODEL
DATE

Classification Cancelled
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AUTHORITY DD 254 6 12 54
DATE 7-13 54

SECRET

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This document contains information affecting the National defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C., Sections 793 and 794. The transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

By
Checked By
Approved By

[redacted]

FORM 1819

1. SCOPE AND CLASSIFICATION:

1.1 This specification covers the following production airplane:

Service Model Designation:	Project MX-1554
Consolidated Vultee Aircraft Corporation Model:	
Number and Places for Crew:	One pilot
Number and Kind of Engine:	One turbo-jet

1.1.1 The mission of this interceptor fighter airplane is to intercept and destroy enemy bombers under all conditions of weather and visibility using MX-904 guided missiles, augmented with 2.75" FFAR rockets. It is primarily designed to operate from ground alert, under ground control, and must fulfill the requirements for general, local, and free-lance air defense.

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS:

2.1 Index of Specifications and Bulletins Approved for Air Force Procurement dated 1 July 1950, including Supplements through 1 September 1950.

2.2 The following publications with dates as listed below form a part of this specification:

Air Force Specification No. 1800-E dated 18 May 1944 and Amendment No. 5 dated 28 May 1945.

Handbook of Instructions for Aircraft Designers, Ninth Edition, including revisions up to and including 1 April 1950.

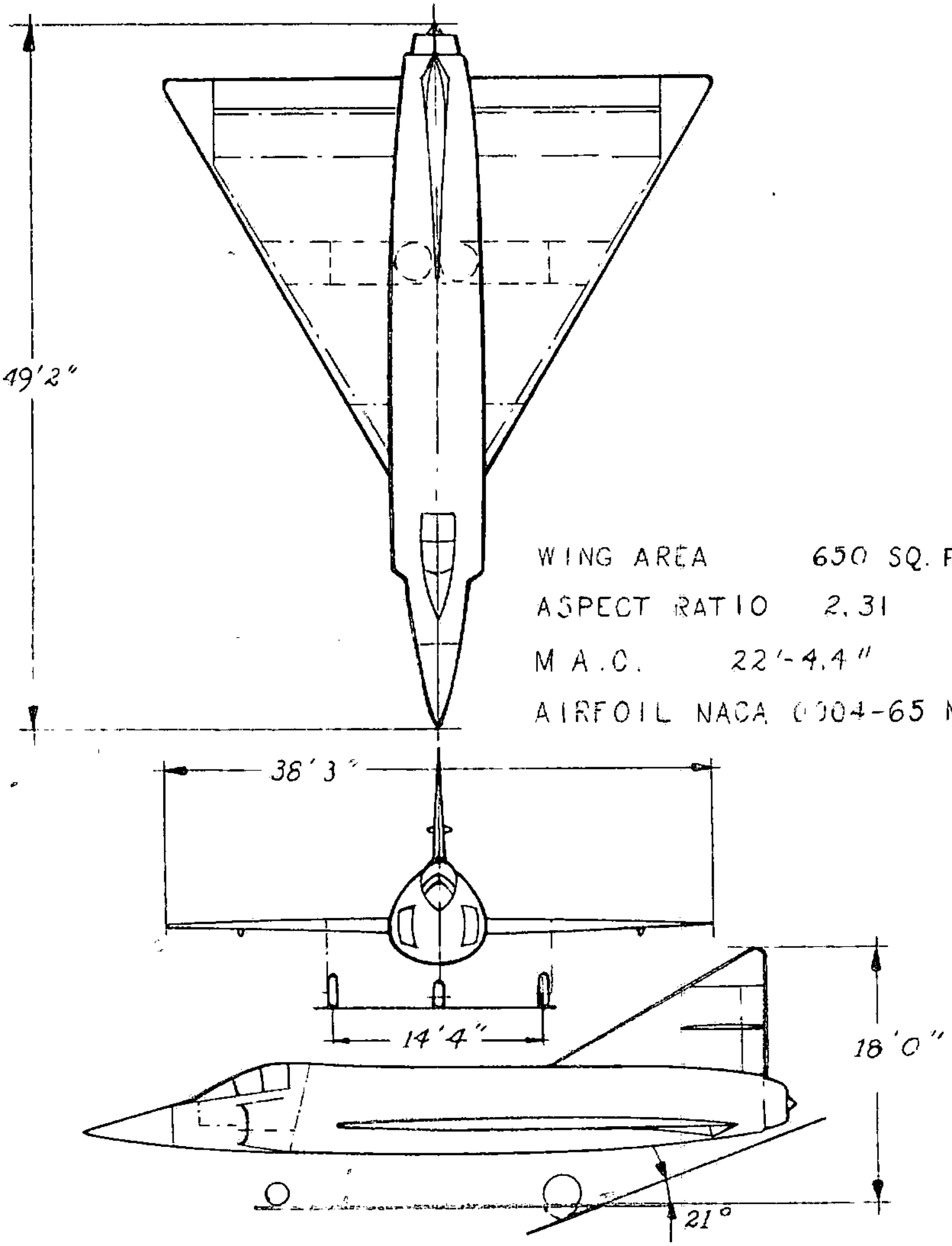
Request for proposal AMC letter MCREOA-4/WRR/bmm dated 1 September 1950.

All other applicable material, process and design specifications and drawings of the issue in effect on 1 September 1950 form a part of this specification.

3. REQUIREMENTS:

3.1 Characteristics: (See following pages)

[redacted]



WING AREA 650 SQ. FT.
ASPECT RATIO 2.31
M.A.C. 22'-4.4"
AIRFOIL NACA 0004-65 MOD.

[redacted]

3. REQUIREMENTS (Cont)

T/O Gross 22,796
J-67 ENG:

3.1.2 Performance:

3.1.2.1 Estimated-Tabulated Performance: The performance of the airplane at combat weight (20,000 lb), unless otherwise specified, is estimated to be as follows:

High Speed with Military Plus Afterburner Power		
35,000 ft	Mach No.	1.93
40,000 ft	Mach No.	1.91
Combat Radius with 1050 Gal Normal Fuel, Cruise Mach No. = 0.9 @ 50,000 Ft, Combat with Military Plus Afterburner Power @ 10,000 Ft		
1.0 min combat	Naut Mi	683
3.4 min combat	Naut Mi	375
(Combat radii are longer for combat at higher altitude)		
Combat Ceiling, with Military Plus Afterburner Power (500 ft/min rate of climb)	Feet	60,700
Time to Climb to Altitude with Military Plus Afterburner Power		
40,000 ft	Minutes	1.33
60,000 ft	Minutes	5.63
Take-Off Without Auxiliary Take-Off Devices over 50-Ft Obstacle with Military Plus Afterburner Power, Take-off Weight 22,796 lb	Feet	1,540
Land Without Auxiliary Landing Devices Over 50-Foot Obstacle with Weight at End of Mission	Feet	3,330 @ 16,047 lb

The above performance is based upon flight of the airplane in NACA standard atmosphere with all doors closed, all antennas submerged or flush, using the engine and power ratings specified in Paragraph 3.12.2.1.

3.1.2.2 Additional Estimated Performance Curves:

[redacted]

PERFORMANCE AT ALTITUDE CURVES.

[redacted]

3. REQUIREMENTS (Cont)

3.1.2.3 The performance specified herein is based on the specific fuel consumptions specified in engine manufacturer's specifications shown in Paragraph 3.12.2.1, increased by 5%.

3.1.3 Weights: See following pages for estimated weight of the airplane.

[redacted]

AN-9103-C [redacted]

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT

PAGE 6
MODEL
REPORT ZD-041

CODE NO.		PROVISIONS FOR EQUIPMENT	STRUCTURE	LANDPLANE or SEAPLANE
1	WING GROUP			2,650
2	CENTER SECTION (OR UPPER CENTER)		290	
3	INTERMEDIATE PANEL (OR UPPER OUTER)	300	1,843	
4	OUTER PANEL (OR LOWER CENTER)			
5	TIPS (OR LOWER OUTER)		74	
6	AILERONS (COUNTER BALANCE WT. LBS.)			
7	~~FLAPS~~ Elevons		143	
8	SLATS			
9				
10	TAIL GROUP			330
11	STABILIZER			
12	ELEVATOR (COUNTER BALANCE WT. LBS.)			
13	FIN		309	
14	RUDDER (COUNTER BALANCE WT. 0 LBS.)		21	
15				
16	BODY GROUP			2,400
17	FUSELAGE OR GONDOLA - LESS ENG. SECTION			
18	BOOMS			
19	HULL			
20	ALIGHTING GEAR - LAND TYPE			1,000
21	MAIN LANDING GEAR		785	
22	AUXILIARY LANDING GEAR (NOSE ~~OR TAIL~~ WHEEL)		205	
23	BUMPER (~~WHEEL OR~~ SKID)		10	
24				
25	ALIGHTING GEAR - WATER TYPE			
26	MAIN FLOATS			
27	AUXILIARY FLOATS			
28	ENGINE SECTION or NACELLE GROUP	Included in Body Group		
29	INNER			
30	CENTER			
31	OUTER			
32				
33	POWER PLANT GROUP			5,220
34	ENGINE (AS INSTALLED)		4,540	
35	ENGINE ACCESSORIES		330	
36	POWER PLANT CONTROLS		15	
37	PROPELLERS			
38	STARTING SYSTEM		75	
39				
40	COOLING SYSTEM			
41	RADIATORS & SHUTTERS			
42	LIQUID			
43	PIPING ETC.			
44	LUBRICATING SYSTEM (Integral with engine)			
45	TANKS AND PROTECTION			
46	PIPING ETC.			
47	FUEL SYSTEM		260	
48	TANKS AND PROTECTION			
49	PIPING ETC.			
50	TOTALS (TO BE BROUGHT FORWARD)			11,600

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AN -9103-C CONFIDENTIAL

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT (Contd.)

PAGE 7
MODEL
REPORT ZD-041

CODE NO.				LANDPLANE or SEAPLANE
1	FIXED EQUIPMENT GROUP			3,105
2	INSTRUMENTS		80	
3	SURFACE CONTROLS		370	
4	HYDRAULIC SYSTEM		350	
5	ELECTRICAL		360	
6	COMMUNICATING and Electronics		1,330	
7	ARMAMENT PROVISIONS ~~(INCLUDING GUNFIRE PROTECTION)~~		155	
8	FURNISHINGS		460	
9	PERSONNEL ACCOMMODATIONS	185		
10	EMERGENCY ACCOMMODATIONS	90		
11	PROVISIONS FOR FLIGHT	40		
12	AIR CONDITIONING EQUIPMENT	145		
13	ANTI-ICING EQUIPMENT (Provisions only)			
14	AUXILIARY POWER PLANT			
15	AUXILIARY GEAR			
16	ANCHOR, TOWING & HOISTING GEAR			
17	ARRESTING GEAR INSTALLATION			
18	EMERGENCY FLOTATION GEAR			
19	SERVICE PICKUP			
20	TOTALS (FROM PAGE 2.0)			11,600
21	WEIGHT EMPTY			14,705

UNIT WEIGHTS

WING GROUP (GROSS AREA 650 SQ.FT.) LBS. PER SQ.FT.	4.08
TAIL GROUP (GROSS AREA 65 SQ.FT.) LBS. PER SQ.FT.	5.08
SUBMERGED DISP. MAIN FLOATS OR HULL ( )	
WEIGHT OF MAIN FLOATS AND BRACING ( )	
WEIGHT OF COOLING SYSTEM PER NORMAL H.P. (H.P.)	
WEIGHT OF LUBRICATING SYSTEM PER GAL. OIL CAP. (GAL. OF OIL)	
WEIGHT OF FUEL SYSTEM PER GAL. CAP. (1,050 GAL. OF FUEL)	0.25

DESIGN INFORMATION

LENGTH - MAX.	49' 2"	MAXIMUM FUSELAGE DEPTH	6' 2"
HEIGHT - MAX. (over fin)	18' 0"	MAXIMUM FUSELAGE WIDTH	6' 2"
SPAN	38' 3"	DESIGN GROSS WEIGHT	
THICKNESS ROOT CHORD	4%	GROSS WEIGHT FOR STRESS ANALYSIS	19,500 *
THICKNESS TIP CHORD			
WING AREA - NET			
LOAD FACTOR - ULTIMATE	11.0		
TAPER RATIO (ROOT CHORD/TIP CHORD)	60° delta		
LENGTH ROOT CHORD	33' 6.6"	TOTAL BULLET PROOF GLASS	0. POUNDS
LENGTH TIP CHORD		TOTAL ARMOUR PLATE	0 POUNDS

REMARKS

"PROVISIONS FOR" CAN BE INTERPRETED AS FOLLOWS:

1. ALL PARTS ASSEMBLED TO ONE BASIC UNIT FOR THE SOLE PURPOSE OF PRODUCING A SUPPORT OR MOUNT FOR EQUIPMENT OR STRUCTURAL UNITS OF ANOTHER BASIC GROUP.
2. IF THE CONTRACTOR'S SYSTEM OF WEIGHT BREAKDOWN INCLUDES ITS PROVISIONS WITH THE BASIC GROUPS, THEN WEIGHTS ORDINARILY ENTERED ON PAGES TITLED "INSTALLATION PROVISIONS FOR" ARE NOT REQUIRED.

SERVICE PICK-UP DOES NOT INCLUDE ENTRAPPED FUEL & OIL

* Design weight 20,000 lb as qualified in paragraph 3.4.1.1

CONFIDENTIAL

AN-9103-C C[redacted]

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT (Contd.)

PAGE 8
MODEL
REPORT ZD-041

USEFUL LOAD

	LOAD CONDITION FULL LOAD	LANDPLANE (SPEC.)	SEAPLANE (SPEC.)	LANDPLANE (ACTUAL)	SEAPLANE (ACTUAL)
1	CREW (NO. 1)	230			
2					
3	PASSENGERS (NO.)				
4	FUEL - ENGINE JP-3 (1,050 GALS.)	6,825			
5	FUEL - TRAPPED IN SYSTEM (GALS.)	60			
6	FUEL - AUXILIARY POWER PLANT (GALS.)				
7	OIL - ENGINE (GALS.))	119			
8	OIL - TRAPPED IN SYSTEM (GALS.))				
9	OIL - AUXILIARY POWER PLANT (GALS.)				
10	OIL - SUPERCHARGER (GALS.)				
11	OIL - REDUCTION GEAR BOX (GALS.)				
12	BAGGAGE				
13					
14	CARGO				
15					
16	ARMAMENT	(983)			
17	FIXED GUNS (TOTAL)				
18	CAL. GUN INSTALLATION				
19	CAL. AMMUNITION				
20	CAL. GUN INSTALLATION				
21	CAL. AMMUNITION				
22	MM. CANNON INSTALLATION				
23	MM. AMMUNITION				
24	Rockets (19) 2.75" FFAR	344			
25	Missiles (6) MX-904	639			
26	GUN SIGHTS				
27	FLEXIBLE GUNS (TOTAL)				
28	CAL. GUN INSTALLATION				
29	CAL. AMMUNITION				
30	CAL. GUN INSTALLATION				
31	CAL. AMMUNITION	* Gross weight 22,940			
32	MM. CANNON INSTALLATION	Warm-up allowance -144			
33	MM. AMMUNITION	Take-off gross weight 22,796			
34					
35					
36	BOMB INSTALLATION				
37					
38					
39	TORPEDO INSTALLATION				
40					
41					
42	EQUIPMENT				
43	NAVIGATION				
44	OXYGEN				
45	PHOTOGRAPHIC				
46	PYROTECHNICS				
47	MISCELLANEOUS - Life Raft	18			
48					
49					
50	USEFUL LOAD	8,235			
51	WEIGHT EMPTY	14,705			
52	GROSS WEIGHT	22,940*			

SECRET

3. **REQUIREMENTS** (Cont)

3.1.3.1 Alternate Loading .... None

3.1.3.2 Take-Off Gross Weight .... Lb 22,796

3.1.4 Center of Gravity Locations:

Take-Off Gross Weight, Center of Gravity Location, Wheels Up:

Aft Leading Edge of MAC .... % MAC 29.3

Above Leading Edge of MAC ....Inches 5.5

Take-Off Gross Weight, Center of Gravity Location, Wheels Down:

Aft Leading Edge of MAC .... % MAC 29.4

Above Leading Edge of MAC .... Inches 4.2

Extreme Positions of Center of Gravity Possible in Flight Regardless of Loading at Take-Off:

	MOST FWD		MOST AFT	
	% MAC	Above Leading Edge MAC (In.)	% MAC	Above Leading Edge MAC (In.)
Wheels Up	23.1	7.7	29.4	6.5
Wheels Down	23.1	5.9	29.5	5.1
Gross Weight	16,115 lb		21,157 lb	

CONFIDENTIAL

3. REQUIREMENTS (Cont)

3.1.5 Areas:

Wing Area, total, including elevons	650	sq ft
Elevon Area, aft of hinge line	56.2	sq ft
Vertical Tail Area, total	65	sq ft
Fin	57	sq ft
Rudder, aft of hinge	8	sq ft

3.1.6 Dimensions and General Data:

Wing:		
Span, maximum (theoretical)	38 ft 9 in.	
Chord:		
At Root	33 ft 6.6 in.	
At Tip (theoretical)	0	
Mean Aerodynamic	22 ft 4.4 in.	
Airfoil Section:		
Designation	NACA 0004-65(Mod)	
Thickness (percent chord)	4	
Incidence (degrees):		
At Root	0	
At Tip	0	
Sweepback of Leading Edge	60	degrees
Dihedral	0	degrees
Aspect Ratio	2.31	
Elevons:		
Span, each	13 ft 2.5 in.	
Chord	2 ft 1.5 in.	
Tail:		
Vertical:		
Airfoil Section:		
Designation	NACA 0004-65(Mod)	
Thickness (percent chord)	4	
Sweepback of Leading Edge	60	degrees
Aspect Ratio	1.15	
Height Over Vertical Tail:		
Reference Line Level	18 ft 0 in.	
Three-Point Position	18 ft 0 in.	
Length, maximum	49 ft 2 in.	
Distance from 25% MAC to Rudder 25% Chord Line	16 ft 11.9 in.	
Ground Angle	21	degrees

CONFIDENTIAL

7

3. REQUIREMENTS (Cont)

Wheel Rim Size:

Main Wheels	15 in.
Nose Wheel	14 in.

Tire Size:

Main Wheel	29 x 7.7
Nose Wheel	24 x 5.5

Tread of Main Wheels	14 ft 4 in.
Wheelbase	19 ft 8.5 in.

Vertical Travel of Axle from Extended to Fully Compressed Position:

Main Wheels	10 in.
Nose Wheel	10 in.

Angle Between Lines Joining Center of Gravity with Points of Contact of Main Wheel Tires, Static Deflection of 1W (front elevation)	99° 40′
Angle of Line Through Center of Gravity and Ground Contact Point of Main Wheel Tire to Vertical Line, Reference Line Level, Static Deflection of 1W (side elevation)	27° 15′

3.1.7 Control Surface and Corresponding Control Movements:

Control surface and control movements on each side of neutral position for full movement as limited by stops, are as follows:

Rudder	20° right	20° Left
Rudder Pedals	3.25" fwd	3.25" aft
Elevons (as elevators)	25° up	15° down
Elevon Control (stick)	5" fwd	9" aft
Elevons (as ailerons)	10° up	10° down
Elevon Control (stick)	7" right	7" left

8

CONFIDENTIAL

3. REQUIREMENTS (Cont)

3.2 General: (Some paragraphs under this heading have been omitted for the purpose of brevity):

3.2.1 General Interior Arrangement: The interior of the fuselage shall be arranged from nose to tail to provide the following:

(a) A nose section consisting of a radome to house the radar antenna and radar equipment portion of MX-1179.

(b) A pressurized pilot's compartment with seat, controls and equipment. A section to house the nose wheel in the retracted position is located below the floor of this compartment.

(c) A section to accommodate the remaining portion of MX-1179. A bay for aircraft forward firing rockets is located in the lower aft region of this section.

(d) A section to accommodate one turbo-jet engine. A bay for guided missiles is located below the engine.

(e) An aft compartment containing engine tail pipe and afterburner, and through which passes the wing spars. A section to house the main wheels in the retracted position is located between the forward wing spars.

3.2.4 Production, Maintenance and Repair: In the design of the airplane, consideration shall be given to ease of production, rapid power plant and equipment installation and ease of servicing and maintenance. Special attention shall be given to simplification of accessibility for routine checks of equipment and provisions for general field maintenance at advance bases where elaborate ground equipment is not usually available. Servicing provisions shall be designed to permit maximum utilization of the airplane under combat conditions.

3.2.12 Crew: The crew shall consist of one pilot.

3.2.13 Equipment Installation:

3.2.13.1 Armament:

Rockets, 2.75" FFAR	19
Guided Missiles, MX-904	6

3.2.13.2 Communication and Navigation Equipment: Part of Hughes Electronic and Control System (MX-1179).

CONFIDENTIAL

3. REQUIREMENTS (Cont)

3.3 Aerodynamics:

3.3.1 General: The airplane shall be designed and constructed to provide the maximum surface smoothness and trueness of aerodynamic contour that are consistent with rapid and economical manufacturing techniques and that are required for high performance.

3.3.2 Stability and Control: The stability and controllability of the airplane shall be in accordance with Air Force Specification No. 1815-B, except as qualified on Page 19 of Convair Report No. ZA-214 submitted herewith.

3.4 Structural Design Criteria:

All limit loads derived from the criteria specified below shall be multiplied by 1.5 to obtain corresponding ultimate loads.

3.4.1 Limit Flight Load Factors:

3.4.1.1 Structural Design Gross Weight .... 20,000 lb *

Maneuver:	Positive	7.33	Negative	3.0
Gust:	Positive	3.5	Negative	1.5

3.4.1.2 Full Load Gross Weight .... 22,940 lb

Maneuver:	Positive	7.33	Negative	3.0
Gust:	Positive	3.13	Negative	1.13

3.4.1.3 Minimum Flying Weight .... 15,384 lb

Gust:	Positive	4.16	Negative	2.16

3.4.2 Limit Ground Load Factors:

Take-Off:

Ground Take-Off (at take-off gross weight 2.0

Landing:

Ground Landing (at take-off gross weight) 2.94

Ground Landing (at landing weight of 20,000* lb) 3.4

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* Earlier determination of combat weight gave 19,500 lb for which Stress Analysis Report ZS-136 and External Loads Report ZU-010 are made. Final determination of combat weight gave 20,000 lb.

3. REQUIREMENTS (Cont)

3.4.3 Limit Diving Speed:

Gross Weight (lb)	Limit Dive Speed (Knots)	% Level Flight High Speed
20,000*	900 Indicated @ 30,000 Feet	114.4% @ 30,000 Feet

* Earlier determination of combat weight gave 19,500 lb for which stress analysis Report ZS-136 and external loads Report ZU-010 are made. Final determination of combat weight gave 20,000 pounds.

3.5 Wing Group:

3.5.1 Description and Components: The wing shall be a delta wing in planform and shall include two elevons, fuel tanks and provisions for attachment of main landing gear and other equipment.

3.5.2 Construction:

3.5.2.1 The wing shall be of full cantilever, stressed skin high strength aluminum alloy construction employing spanwise spars of built-up shear-web type and chordwise ribs and bulkheads.

3.5.2.2 The wing interspar area outboard of the fuselage shall be designed for integral fuel tanks.

3.5.2.3 The wing leading edges shall be designed for thermal anti-icing.

3.5.2.4 Wing tips shall be readily removable.

3.5.3 Elevons: Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be of riveted metal torque box and rib construction with metal covering.

Differential Motion (as ailerons)	None
Distance from Plane of Symmetry to Centroid of Elevon Area	9 ft 0 in.
Type of Balance	None
Tabs	None

3. REQUIREMENTS (Cont)

3.5.4 Lift and Drag Increasing Devices: See Paragraph 3.7.1.6.

3.6 Tail Group:

3.6.1 Description and Components: The tail group shall consist of a single vertical fin and rudder.

3.6.2 Stabilizer: Not applicable.

3.6.3 Elevator: Not applicable.

3.6.4 Fin: The fin shall be of riveted cantilever, high strength aluminum alloy construction attached to the fuselage and including provision for attachment of the rudder. The structure shall consist of spars and ribs with stressed metal covering. The leading edge shall be designed for thermal anti-icing. The tip shall be of plastic material for housing antennas.

3.6.5 Rudder: The rudder shall be of riveted metal torque box and rib construction with metal covering. Trim tabs are not required. Balancing of rudder is not required.

3.7 Body Group:

3.7.1 Fuselage:

3.7.1.1 Description: The fuselage shall include a radome nose section, a pressurized pilot's compartment, a section for electronics and control equipment and offensive armament, and an engine section.

3.7.1.2 Construction: The fuselage shall be of riveted high strength aluminum alloy construction with bulkheads and beltframes and stressed-skin metal covering. Corrosion and heat resisting material shall be used where required in the engine section.

3.7.1.3 Crew and Personnel Stations:

3.7.1.3.1 The pilot's compartment shall include provision for one ejection seat, flight controls, instruments and power plant and accessory controls and instruments. The center of the instrument panel shall accommodate the pilot's display component of the (MX-1179) Electronics and Control System. Provision shall also be made for an automatic position plotter convenient to the pilot, also a part of MX-1179.

12

CONFIDENTIAL

3. REQUIREMENTS (Cont)

3.7.1.3.2 The pilot's compartment shall be designed to be pressurized as specified in Paragraph 3.20.1.

3.7.1.3.3 Provision shall be made for the pilot to enter and leave the airplane without the use of separate ladders or platforms.

3.7.1.3.4 The pilot's compartment shall be equipped with a hinged canopy, which shall be spring-balanced for manual operation, for normal entrance and exit and which shall be capable of being jettisoned by means of a canopy remover fired as a part of the seat ejection sequence for emergency exit in flight.

3.7.1.4 Cargo Compartments: Not applicable.

3.7.1.5 Equipment Compartments: Space and weight provisions shall be made to install MX-1179 Electronics and Control System equipment having a total volume of 47 cubic feet and an estimated weight of 1298 pounds in and adjacent to the pilot's compartment. The detail distribution of this equipment shall be jointly determined with Hughes Aircraft Corp.

3.7.1.6 Speed Brakes: Provision shall be made to use the door covering the rocket bay as a means of increasing airplane drag during descent prior to landing.

3.7.1.7 Rocket and Missile Bays: Two bays shall be provided in the fuselage for carrying the specified armament. The forward bay shall accommodate a total of nineteen 2.75 inch folding fin aircraft rockets (FFAR). The aft bay shall accommodate six Hughes MX-904 guided missiles. The bay openings shall be equipped with doors on which the rockets and missiles will be mounted and which will be capable of being extended for firing.

3.7.1.8 Provision shall be made to house the nose wheel and two main wheel landing gear units in the fuselage. The openings shall be equipped with hinged doors.

3.7.2 Hull: Not applicable.

3.8 Alighting Gear:

3.8.1 General Description and Components: The landing gear shall be of the retractable, tricycle type, consisting of a single wheel nose gear unit and two single wheel main gear units, including shock absorber struts. The landing gear shall be

CONFIDENTIAL

13

3. REQUIREMENTS (Cont)

hydraulically retracted and extended. The main gear wheels shall be equipped with hydraulic brakes. The nose wheel shall be free to swivel within the limits imposed by the centering device and shimmy damper.

3.9 Alighting Gear (Water Type): Not applicable.

3.10 Surface Control System:

3.10.1 The primary flight control system shall be an irreversible, full hydraulic power system including artificial feel and trimming devices. The cockpit elements of the system shall include the pilot's rudder pedals, control stick and trim controls. This systemshall be interconnected with the MX-1179 Electronic and Control System as required.

3.10.2 A completely independent dual hydraulic power system shall be provided so that, in the event of failure of one of the control systems, the remaining system will continue to function. Both systems shall operate continuously and each shall be independently capable of providing the necessary control forces required for safe flying and landing of the airplane. In the event of failure of the engine, a reserve accumulator shall provide the pressure to permit a limited number of operations of the control system.

3.11 Engine Section: The aft section of the fuselage shall be designed to accommodate the turbo-jet engine specified herein. A firewall shall be provided and the engine shall be shrouded as necessary for cooling and fire protection purposes.

3.12 Propulsion:

3.12.1 General Description and Components: The propulsion group includes the turbo-jet engine specified below, the required accessories and related systems.

3.12.2 Main Propulsion Unit:

3.12.2.1 The airplane shall be equipped with one Wright Aeronautical Corporation YJ67-W-1 turbo-jet engine, with afterburner, in accordance with Specification No. AC-161 dated 21 March 1950 and rated at 19,700 pounds of thrust, static at sea level, , with afterburner.

3. **REQUIREMENTS** (Cont)

3.12.3 Auxiliary Propulsion Unit: Not required.

3.12.4 Engine-Driven Accessories: Two hydraulic Pumps and one d-c generator shall be installed on and driven by the engine.

3.12.5 Air Induction System: Air inlets, with boundary layer bleeds, shall be located on each side of the fuselage adjacent to the pilot's compartment with ducts extending aft to the engine. The air inlet duct lips shall incorporate provisions for anti-icing.

3.12.6 Exhaust System: The engine shall be furnished complete with exhaust system, including afterburner with variable area nozzle. The Contractor may modify the engine as required to provide a section of tailpipe between the engine and afterburner in order to lengthen the engine for optimum nozzle location.

3.12.7 Cooling System: Provision shall be made to supply cooling air for the engine and engine accessories.

3.12.8 Lubricating System: The engine shall be furnished complete with lubricating system including the oil tank, oil-fuel heat exchanger (oil cooler), pumps, lines, strainer and valves.

3.12.9 Fuel System:

3.12.9.1 The fuel system shall include pressurized wing integral fuel tanks of 1050 gallons net capacity. Two air-driven fuel booster pumps shall be provided in the wing tanks. Provision shall be made for pressure or gravity refueling of the fuel tanks.

3.12.9.2 Air shall be bled from the engine compressor section and passed through heated carbon contained in a tube of streamline cross section passing through the engine exhaust tailpipe and then cooled for the purpose of providing inert gases for fuel tank purging and pressurizing.

3.12.11 Propulsion System Controls: The Contractor shall provide a power control lever for the pilot and shall connect this lever with the selector furnished with the engine.

3.12.12 Starting System: The starting system shall include a cartridge type starter not requiring an external source of power. The starting switch shall be located for use by the pilot.

3. REQUIREMENTS (Cont)

3.12.13 Propeller: Not applicable.

3.12.14 Rocket Propulsion System: Not required.

3.13 Auxiliary Power Plant: Not required.

3.14 Instruments and Navigation Equipment:

3.14.1 Instruments: The following instruments shall be located on the pilot's instrument panel:

- One pilot's display including flight and navigation instruments as a part of MX-1179
- One standby compass
- One clock
- One cabin pressure altimeter
- One dual hydraulic pressure indicator
- One total fuel flow and fuel remaining indicator
- One oil temperature indicator
- One oil pressure indicator
- One tachometer
- One turbine outlet temperature indicator
- One voltammeter
- Indicator lights for low fuel quantity, low fuel pressure, etc.

3.14.2 Navigation Equipment: Included in MX-1179 Electronic and Control System equipment.

3.15 Hydraulic and Pneumatic Systems:

3.15.1 Hydraulic System:

3.15.1.1 Description and Components: The hydraulic system shall be of the closed center type with an operating pressure of 3000 psi. The surface control hydraulic system shall be two independent systems of equivalent capacity. The source of pressure shall be two pumps driven by the turbo-jet engine, with an accumulator for emergency standby use.

3.15.1.2 Summary of Actuated Items: The hydraulic system shall be used to actuate the following items:

- Surface control system
- Landing gear
- Rocket bay doors
- Missile bay door
- Landing gear doors

3. REQUIREMENTS (Cont)

3.15.2 Pneumatic System:

3.15.2.1 Description and Components: A low-pressure pneumatic system shall be provided. The system shall obtain air pressure by means of bleeds from the turbo-jet engine compressor section.

3.15.2.2 Summary of Actuated Items: The pneumatic system pressure shall be utilized for the following purposes:

Cabin pressurization and air conditioning
Alternator drive
Fuel booster pump drive
Fuel tank pressurization and purging
Wing and tail leading edge and air intake duct anti-icing
Compressed air for missiles
Pressurization and cooling of MX-1179 Electronic and Control System equipment

3.16 Electrical:

3.16.1 The electrical system shall be a 115-volt, 400-cycle, 3-phase system including one 30 KVA alternator and regulator. Direct current shall be supplied by means of one 300-ampere engine-driven generator and 24-volt battery. The alternator shall be driven by the cabin pressure system refrigeration turbine with constant frequency output. A small inverter shall be installed to provide limited a-c power in the event of alternator failure.

3-16.2 The electrical system shall include connections to supply power required for the specified guided missiles and the MX-1179 Electronic and Control System equipment.

3.17 Electronics:

3.17.1 List of Equipment: The Contractor shall install the Hughes Aircraft Corp MX-1179 Electronic and Control System components consisting of the following equipment:

3. REQUIREMENTS (Cont)

Equipment	Weight (Lb)	Displaced Volume (Cu Ft)
Radar	380	9.45
Computing and Aircraft Control Equipment	209	7.00
Pilot's Display and Controls	55	2.25
Missile Auxiliaries	60	2.30
Data Receiver and Recoder	40	1.10
Communications Receivers and Transmitters	155	4.00
IFF and Beacon Equipment	80	2.30
Landing and Navigation Receivers	110	2.10
Flight Sensing Instruments	69	2.00
Power Supply	120	3.00
Antennas	20	--
Totals	1298	35.50
Plus space allowance for brackets, mounts, plugs and cables	--	11.50
Total	1298	47.00

3.17.2 A radome shall be provided in the nose of the fuselage to accommodate a radar antenna having a swept volume of approximately 26 inches in diameter. An antenna housing shall form the tip of the vertical fin. The development and location of additional antennas shall be the joint concern of Hughes Aircraft Corporation and the Contractor.

3. REQUIREMENTS (Cont)

3.18 Armament:

3.18.1 Description: The armament installation shall consist of the specified aircraft rockets and guided missiles and related equipment.

3.18.2 Fixed Guns: Not required.

3.18.3 Rockets and Missiles:

3.18.3.1 Rockets: The bay in the lower surface of the fuselage shall accommodate nineteen 2.75" folding-fin aircraft rockets (FFAR) mounted on the rocket bay door. The door shall be extended for rocket firing. Arming controls shall be located convenient to the pilot. The installation will be controlled by the MX-1179 equipment.

3.18.3.2 Missiles: The bay immediately aft of the rocket bay shall accommodate six Hughes MX 904 missiles mounted on the missile bay doors. The doors shall be extended for missile firing. MX 1179 equipment shall provide automatic prelaunch adjustments. Arming controls shall be located convenient to the pilot. The installation will permit firing all missiles in one ripple salvo controlled by MX-1179 equipment.

3.18.4 Flexible Guns: Provisions for flexible guns are not required.

3.18.5 Stores: Provisions for stores are not required.

3.18.6 Passive Defense: Armor plate and bullet-resistant glass are not required.

3.19 Furnishings and Equipment:

3.19.1 Accommodations for Personnel: An ejection seat shall be provided for the pilot in accordance with Specification No. 25282. Provision shall be made for use of an anti-G suit by the pilot.

3.19.2 Miscellaneous Equipment: Miscellaneous equipment for this airplane shall include a relief tube, instrument panels, airplane flight report holder, data case, check list and holder.

3.19.3 Furnishings: Furnishings shall include thermal and acoustical insulation, etc.

3. REQUIREMENTS (Cont)

3.19.4 Emergency Equipment: Fire detection equipment shall be provided for the engine accessory and burner compartments with warning indicators on the pilot's instrument panel. Engine fire extinguishers are not required. Portable and hand-type extinguishers are not required.

3.19.5 Oxygen Equipment: An oxygen system shall be installed for the pilot. The system shall consist of two 295 cubic inch, high-pressure cylinders, demand regulators, distribution piping and oxygen pressure and flow instruments. A filler valve shall be provided for recharging cylinders.

3.19.6 Emergency Rescue Equipment: The emergency rescue equipment for the pilot shall consist of a one-man seat-type life raft and back-type parachute. First aid kit, knife, emergency sustenance kit and anti-exposure suit are not required.

3.20 Air Conditioning and Anti-Icing Equipment:

3.20.1 Air Conditioning: The air for cabin pressurizing, heating, cooling and ventilating shall be obtained by means of bleeds from the comoressor section of the turbo-jet engine. The system shall include the required pressure regulating and relief valves, refrigeration unit, lines and controls. Normal operating pressure differential shall be 5 psi.

3.20.2 Anti-Icing: Structural provision only shall be made to anti-ice the wing and tail leading edges and engine air intake ducts by means of engine bleed air passed through a heat exchanger and directed to these surfaces. Provision shall also be made to anti-ice the windshield and to defrost and defog all transparent areas of the cockpit enclosure. The specified engine includes built-in anti-icing protection. The extent of anti-icing protection required, if any, shall be determined by analytical study prior to delivery of production airplanes.

3.21 Photographic: Not required.

3.22 Auxiliary Gear: Auxiliary gear shall include provision for attachment of a nose wheel towing and steering bar, provisions for jacking, provisions for mooring, provisions for hoisting and provisions for leveling the airplane.

4. SAMPLING, INSPECTION AND TEST PROCEDURES:

4.1 The method of inspection and tests shall be in accordance with Specification No. R-1800-E dated 18 May 1944 and Amendment No. 5 dated 28 May 1945.

5. PREPARATION FOR DELIVERY:

5.1 Preparation for delivery shall be in accordance with Specification No. R-1800-E dated 18 May 1944 and Amendment No. 5 dated 28 May 1945.

6. NOTES:

6.1 Explanatory Information: See applicable data, Appendix III.

6.2 Additional Information: See applicable data, Appendix III.

6.3 Definitions: Definitions of the Handbook of Instructions for Airplane Designers, NACA Technical Report No. 474 and Specification No. MIL-I-6252 (USAF) are considered applicable to the airplane described herein.

APPENDIX I

APPENDIX I-A

Government Furnished Property, Contractor Installed

Power Plant (Weight Empty)

Item	Quan	Description	Identification	Unit Weight (Lb)
1	1	Engine, Turbo-Jet, Including Afterburner, Wright (dry)	YJ67-W-1	4425.0
2	1	Starter, Cartridge Type ...		60.0

Instruments (Weight Empty)

Item	Quan	Description	Identification	Unit Weight (Lb)
1	1	Compass, Standby		0.8
2	1	Clock		0.9
3	1	Altimeter, Cabin Pressure .		0.5
4	1	Indicator, Hydraulic Pressure (dual)		1.0
5	2	Transmitters, Hydraulic Pressure		1.4
6	1 Set	Fuel Flow Equipment, Including Indicator, Amplifier, Etc.		30.0
7	1	Indicator, Oil Temperature.		0.7
8	1	Indicator, Oil Pressure ...		0.6
9	1	Transmitter, Oil Pressure .		1.4
10	1	Indicator, Tachometer		1.0
11	1	Generator, Tachometer		1.5
12	1	Indicator, Turbine Outlet Temperature		1.0
13	Reqd	Resistors and Connectors ..		--
14	1	Indicator, Oxygen Pressure.		1.0
15	1	Indicator, Oxygen Flow		0.8

Electrical (Weight Empty)

Item	Quan	Description	Identification	Unit Weight (Lb)
1	1	Alternator, 30 KVA		75.0
2	1	Generator, 28-Volt, 300 Amp		59.0
3	1	Regulator, Alternator		12.5
4	1	Inverter		6.5
5	1	Battery, AN3150		77.0
6	1	Regulator, Generator		2.5

APPENDIX I

APPENDIX I-A

Item	Quan	Description	Identification	Unit Weight (Lb)
		Electronics (Weight Empty)		
1	1 Set	Electronic and Control System MX-1179	Hughes	1298.0
		Miscellaneous (Weight Empty)		
1	1 Set	Nose wheel, tire and tube ..		45.0
2	2 Sets	Main wheels, tires, tubes and brakes		147.5
3	2	Oxygen cylinders, 295 cu in.		14.0
4	1	Regulator, oxygen		2.0
5	1	Lap belt and shoulder harness		5.0
6	1	Canopy Remover, M-2	X48R274	2.5
7	1	Regulating valve, anti-g suit	AN6538-2	1.8
8	1	Filter, anti-g suit	AN6538-3	1.0
9	1	Drogue parachute		6.0
10	1	Personnel ejection catapult.		10.0
11	1	Personnel ejection cartridge		0.5
12	1	Time delay cartridge		0.2

APPENDIX I

APPENDIX I-B

Government Furnished Equipment, Government Installed

Armament (Design Useful Load)

Item	Quan	Description	Identification	Unit Weight (Lb)
1	19	Rockets, Aircraft folding-fin, 2.75"	FFAR	18.1
2	6	Missiles, air-to-air	Hughes MX-904	106.5

APPENDIX I

APPENDIX I-C

Contractor Furnished Equipment, Contractor Installed

Power Plant (Weight Empty)

Item	Quan	Description	Identification	Unit Weight (Lb)
1	2	Pumps, fuel booster, air-driven		

Electrical (Weight Empty)

Item	Quan	Description	Identification	Unit Weight (Lb)
1	1	Voltammeter		
2	Reqd	Relays, switches, circuit breakers, etc.		

Miscellaneous (Weight Empty)

Item	Quan	Description	Identification	Unit Weight (Lb)
1	3	Landing gear shock struts ..		
2	1	Ejection seat assembly		
3	1-Set	Air conditioning equipment .		
4	1 Set	Fire detection equipment ...		
5	1	Oxygen filler valve		

APPENDIX II

DEVIATIONS

No deviations from applicable requirements are required.

APPENDIX III

APPLICABLE DATA

APPENDIX III-A

LIST OF APPLICABLE DRAWINGS AS SUBMITTED

A complete list of applicable drawings submitted is shown in Contractor's Report No. ZP-50-10003.

APPENDIX III-B

LIST OF REPORTS AS SUBMITTED

Report No.	Title	Date
ZU-010	External Loads	29 December 1950
ZS-136	Preliminary Stress Analysis	29 December 1950
ZW-034	Preliminary Weight and Balance Data	29 December 1950
ZA-215	Estimated Performance Characteristics	29 December 1950
ZA-215	App. 1A - Westinghouse XJ40-WE-10 Engine Specification	29 December 1950
ZA-215	App. 1B - Wright YJ67-W-1 Engine Specification	29 December 1950
ZA-214	Stability and Control Analysis	29 December 1950
ZP-50-10002	Operational Information	29 December 1950
ZP-50-10003	Technical Information	29 December 1950
ZP-50-10004	Logistics Information	29 December 1950
ZD-041	Preliminary Model Specification	29 December 1950
	Standard Aircraft Characteristics Charts	29 December 1950

APPENDIX III-C

LIST OF ADDITIONAL PUBLICATIONS

See list of reports in Appendix III-B

APPENDIX III

APPENDIX III-D

NEW AND NOVEL FEATURES

1. The 60-degree delta wing configuration of the proposed design provides superior aerodynamic and structural characteristics for solution of the USAF interception problems of local air defense, general air defense and free-lance defense operation.

2. The rocket bay door on the bottom of the fuselage is designed to function also as a drag increasing device, for descent from altitude or deceleration in flight.

3. Combining the functions of the fuel tank pressurization system and the purging system offers distinct advantages in weight and simplicity. Bleed air is drawn from existing connections on the engine compressor section and passed through an engine exhaust system heat exchanger containing carbon. The air is thus heated and the oxygen replaced with carbon dioxide and carbon monoxide gases, forming a nonexplosive mixture. This mixture is distributed to the fuel tanks for pressurization, to control fuel vapor losses, and for purging.

APPENDIX IV

T/O GROSS 22 396

PROTOTYPE AIRPLANE

This appendix describes a prototype airplane essentially identical to the airplane described in the basic specification, but which incorporates an XJ40-WE-10 engine in lieu of the YJ67-W-1 engine. The paragraphs of this appendix replace the corresponding paragraphs of the basic specification and are only those which are affected by the substitution of this engine.

3.1.2 Performance:

3.1.2.1 Estimated-Tabulated Performance: The performance of the airplane at combat weight (20,000 lb), unless otherwise specified, is estimated to be as follows:

High Speed with Military Plus Afterburner Power:		
35,000 ft	Mach No.	1.88
40,000 ft	Mach No.	1.77
Combat Radius with 1050 gal Normal Fuel, Cruise Mach No. = 0.9 @ 45,000 Ft, Combat with Military Plus Afterburner Power @ 10,000 ft:		
1.0 min combat	Naut Mi	634
3.7 min combat	Naut Mi	375
(Combat radii are longer for combat at higher altitude)		
Combat Ceiling with Military Plus Afterburner Power (500 ft/min rate of climb)	Feet	56,500 (50,000 feet present engine limit)
Time to Climb to 40,000 Feet with Military Plus Afterburner Power	Minutes	2.04
Take-Off, Without Auxiliary Take-off Devices Over 50-ft Obstacle with Military Plus Afterburner Power, Take-off Weight 22,396 lb	Feet	2,030
Landing, Without Auxiliary Landing Devices, over 50-ft Obstacle with Weight at End of Mission	Feet	3,250 @ 15,658 lb

The above performance is based upon flight of the airplane in NACA standard atmosphere with all doors closed, all antenna submerged or flush, using the engine and power ratings specified in Paragraph 3.12.2.1.

3.1.2.2 Additional Estimated Performance Curves:

APPENDIX IV

PERFORMANCE AT ALTITUDE CURVES

	NAME	DATE
PREPARED		
CHECKED		

SECRET

GROUP WEIGHT STATEMENT
APPENDIX IV

PAGE 34
MODEL
REPORT ZD-041

CODE NO.		PROVISIONS FOR EQUIPMENT	STRUCTURE	LANDPLANE or SEAPLANE
1	WING GROUP			2,650
2	CENTER SECTION (OR UPPER CENTER)		290	
3	INTERMEDIATE PANEL (OR UPPER OUTER)	300	1,843	
4	OUTER PANEL (OR LOWER CENTER)			
5	TIPS (OR LOWER OUTER)		74	
6	AILERONS (COUNTER BALANCE WT. LBS.)			
7	~~FLAPS~~ Elevons		143	
8	SLATS			
9				
10	TAIL GROUP			330
11	STABILIZER			
12	ELEVATOR (COUNTER BALANCE WT. LBS.)			
13	FIN		309	
14	RUDDER (COUNTER BALANCE WT. 0 LBS.)		21	
15				
16	BODY GROUP			2,455
17	FUSELAGE OR GONDOLA - LESS ENG. SECTION			
18	BOOMS			
19	HULL			
20	ALIGHTING GEAR - LAND TYPE			1,000
21	MAIN LANDING GEAR		785	
22	AUXILIARY LANDING GEAR (NOSE ~~OR TAIL~~ WHEEL)		205	
23	BUMPER ~~(WHEEL OR~~ SKID)		10	
24				
25	ALIGHTING GEAR - WATER TYPE			
26	MAIN FLOATS			
27	AUXILIARY FLOATS			
28	ENGINE SECTION or NACELLE GROUP	Included in Body Group		
29	INNER			
30	CENTER			
31	OUTER			
32				
33	POWER PLANT GROUP			4,765
34	ENGINE (AS INSTALLED) (XJ40-WE-10)		4,085	
35	ENGINE ACCESSORIES		330	
36	POWER PLANT CONTROLS		15	
37	PROPELLERS			
38	STARTING SYSTEM		75	
39				
40	COOLING SYSTEM			
41	RADIATORS & SHUTTERS			
42	LIQUID			
43	PIPING ETC.			
44	LUBRICATING SYSTEM (Integral with engine)			
45	TANKS AND PROTECTION			
46	PIPING ETC.			
47	FUEL SYSTEM		260	
48	TANKS AND PROTECTION			
49	PIPING ETC.			
50	TOTALS (TO BE BROUGHT FORWARD)			11,200

SECRET

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT (Contd.)
APPENDIX IV

MODEL

REPORT ZD-041

CODE NO.				LANDPLANE or SEAPLANE
1	FIXED EQUIPMENT GROUP			3,105
2	INSTRUMENTS		80	
3	SURFACE CONTROLS		370	
4	HYDRAULIC SYSTEM		350	
5	ELECTRICAL		360	
6	COMMUNICATING and Electronics		1,330	
7	ARMAMENT PROVISIONS ~~(INCLUDING GUNFIRE PROTECTION)~~		155	
8	FURNISHINGS		460	
9	PERSONNEL ACCOMMODATIONS	185		
10	EMERGENCY ACCOMMODATIONS	90		
11	PROVISIONS FOR FLIGHT	40		
12	AIR CONDITIONING EQUIPMENT	145		
13	ANTI-ICING EQUIPMENT (Provisions only)			
14	AUXILIARY POWER PLANT			
15	AUXILIARY GEAR			
16	ANCHOR, TOWING & HOISTING GEAR			
17	ARRESTING GEAR INSTALLATION			
18	EMERGENCY FLOTATION GEAR			
19	SERVICE PICKUP			
20	TOTALS (FROM PAGE 2.0)			11,200
21	WEIGHT EMPTY			14,305

UNIT WEIGHTS

WING GROUP (GROSS AREA 650 SQ.FT.) LBS. PER SQ.FT.	4.08
TAIL GROUP (GROSS AREA 65 SQ.FT.) LBS. PER SQ.FT.	5.08
SUBMERGED DISP. MAIN FLOATS OR HULL ( )	
WEIGHT OF MAIN FLOATS AND BRACING ( )	
WEIGHT OF COOLING SYSTEM PER NORMAL H.P. (H.P.)	
WEIGHT OF LUBRICATING SYSTEM PER GAL. OIL CAP. (GAL. OF OIL)	
WEIGHT OF FUEL SYSTEM PER GAL. CAP. (1,050 GAL. OF FUEL)	0.25

DESIGN INFORMATION

LENGTH - MAX.	49' 2"	MAXIMUM FUSELAGE DEPTH	6' 2"
HEIGHT - MAX. (over fin)	18' 0"	MAXIMUM FUSELAGE WIDTH	6' 2"
SPAN	38' 3"	DESIGN GROSS WEIGHT	
THICKNESS ROOT CHORD	4%	GROSS WEIGHT FOR STRESS ANALYSIS	19,500 *
THICKNESS TIP CHORD			
WING AREA - NET			
LOAD FACTOR - ULTIMATE	11.0		
TAPER RATIO (ROOT CHORD/TIP CHORD)	60° delta		
LENGTH ROOT CHORD	33' 6"	TOTAL BULLET PROOF GLASS	0 POUNDS
LENGTH TIP CHORD		TOTAL ARMOUR PLATE	0 POUNDS

REMARKS

"PROVISIONS FOR" CAN BE INTERPRETED AS FOLLOWS,

1. ALL PARTS ASSEMBLED TO ONE BASIC UNIT FOR THE SOLE PURPOSE OF PRODUCING A SUPPORT OR MOUNT FOR EQUIPMENT OR STRUCTURAL UNITS OF ANOTHER BASIC GROUP.
2. IF THE CONTRACTOR'S SYSTEM OF WEIGHT BREAKDOWN INCLUDES ITS PROVISIONS WITH THE BASIC GROUPS, THEN WEIGHTS ORDINARILY ENTERED ON PAGES TITLED "INSTALLATION PROVISIONS FOR" ARE NOT REQUIRED.

SERVICE PICK-UP DOES NOT INCLUDE ENTRAPPED FUEL & OIL

* Design weight 20,000 pounds as qualified in Para 3.4.1.1.

SECRET

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT (Contd.)
APPENDIX IV

PAGE 36
MODEL
REPORT ZD-041

USEFUL LOAD

LOAD CONDITION FULL LOAD		LANDPLANE (SPEC.)	SEAPLANE (SPEC.)	LANDPLANE (ACTUAL)	SEAPLANE (ACTUAL)
1	CREW (NO. 1)	230			
2					
3	PASSENGERS (NO.)				
4	FUEL - ENGINE JP-3 (1,050 GALS.)	6,825			
5	FUEL - TRAPPED IN SYSTEM (GALS.)	60			
6	FUEL - AUXILIARY POWER PLANT (GALS.)				
7	OIL - ENGINE (GALS.)	119			
8	OIL - TRAPPED IN SYSTEM (GALS.)				
9	OIL - AUXILIARY POWER PLANT (GALS.)				
10	OIL - SUPERCHARGER (GALS.)				
11	OIL - REDUCTION GEAR BOX (GALS.)				
12	BAGGAGE				
13					
14	CARGO				
15					
16	ARMAMENT	(983)			
17	FIXED GUNS (TOTAL)				
18	CAL. GUN INSTALLATION				
19	CAL. AMMUNITION				
20	CAL. GUN INSTALLATION				
21	CAL. AMMUNITION				
22	MM. CANNON INSTALLATION				
23	MM. AMMUNITION				
24	Rockets (19) 2.75" FFAR	344			
25	Missiles (6) MX-904	639			
26	GUN SIGHTS				
27	FLEXIBLE GUNS (TOTAL)				
28	CAL. GUN INSTALLATION				
29	CAL. AMMUNITION				
30	CAL. GUN INSTALLATION				
31	CAL. AMMUNITION				
32	MM. CANNON INSTALLATION				
33	MM. AMMUNITION				
34					
35					
36	BOMB INSTALLATION				
37					
38					
39	TORPEDO INSTALLATION				
40					
41					
42	EQUIPMENT				
43	NAVIGATION				
44	OXYGEN				
45	PHOTOGRAPHIC				
46	PYROTECHNICS				
47	MISCELLANEOUS - Life raft	18			
48					
49					
50	USEFUL LOAD	8,235			
51	WEIGHT EMPTY	14,305			
52	GROSS WEIGHT	22,540 *			

*	
Gross Weight	22,540
Warm-Up Allowance	-144
Take-off Gross Weight	22,396

SECRET

APPENDIX IV

3.1.3.2 Take-Off Gross Weight .... Lb 22,396

3.12.2.1 The airplane shall be equipped with one Westinghouse XJ40-WE-10 turbo-jet engine, with afterburner, in accordance with Specification No. WAGT-X40E8A-2 dated 26 September 1950.

Appendix I-A

Government Furnished Property - Contractor Installed

Power Plant (Weight Empty)

Item	Quan	Description	Identification	Unit Weight (Lb)
1	1	Engine, Turbo-jet, including afterburner, Westinghouse (dry)	XJ40-WE-10	3970

APPENDIX V

SUMMARY OF OPTIONAL ARRANGEMENTS

A summary comparison of the airplane weight and performance with the alternate engine specified in Appendix IV is presented in Contractor's Report No. ZP-50-10003 submitted with this model specification.

APPENDIX VI

BALANCE CALCULATIONS

Balance calculations are presented in the Weight and Balance Data Report No. ZW-034 submitted with this model specification in accordance with Specification No. 40140.

1863

40

[redacted]
INFORMATION

[redacted]

UNCLASSIFIED

PRELIMINARY

YF-102

SPEC

GR. 4
DOWNGRADED AT 3 YEAR INTERVALS; DECLASSIFIED AFTER
12 YEARS.
DOD DIR 5200.10

[redacted]
SECURITY INFORMATION

[redacted]

CONSOLIDATED VULTEE AIRCRAFT CORPORATION

SAN DIEGO DIVISION . . SAN DIEGO, CALIFORNIA

ANALYSIS
PREPARED BY
CHECKED BY
REVISED BY

CONSOLIDATED VULTEE AIRCRAFT CORPORATION
SAN DIEGO DIVISION

UNCLASSIFIED

PAGE
REPORT NO.
MODEL
DATE

Copy 49

[redacted]

SECURITY INFORMATION

[redacted]

PRELIMINARY

MODEL SPECIFICATION

FOR

CONVAIR MODEL 8
UNITED STATES AIR FORCE MODEL YF-102
INTERCEPTOR FIGHTER AIRPLANE
CONTRACT AF33(600)-5942

* * * * *

REPORT NO. ZD-8-001
DATED 1 MARCH 1952

* * * * *

SUPERSEDES ZD-041
DATED 29 DECEMBER 1950

* * * * *

GR. 4
DOWNGRADED AT 3 YEAR INTERVALS; DECLASSIFIED AFTER 12 YEARS
DOD DIR 5200.10

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By ____________________

Authorized by: TO 254 Date 10/15/55

Checked ____________________

Reclassified by: Dept. 6 Date 1/16/56

[redacted]oved ____________________

[redacted]

SECURITY INFORMATION

UNCLASSIFIED

FORM 1812

SECRET
SECURITY INFORMATION

TABLE OF CONTENTS

1.	SCOPE AND CLASSIFICATION	1
2.	APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS	1
3.	REQUIREMENTS	2
3.1.	CHARACTERISTICS	2
3.1.1	THREE VIEW DRAWINGS	2
3.1.2	PERFORMANCE	4
3.1.3	WEIGHTS	5
3.1.4	CENTER OF GRAVITY LOCATIONS	10
3.1.5	AREAS	12
3.1.6	DIMENSIONS AND GENERAL DATA	12
3.1.7	CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS	14
3.2	GENERAL	14
3.2.1	GENERAL INTERIOR ARRANGEMENT	14
3.2.2	MATERIALS	15
3.2.3	WORKMANSHIP	15
3.2.4	PRODUCTION, MAINTENANCE AND REPAIR	15
3.2.5	INTERCHANGEABILITY & REPLACEABILITY	15
3.2.6	FINISH	15
3.2.7	IDENTIFICATION AND MARKING	15
3.2.8	EXTREME TEMPERATURE OPERATION	15
3.2.9	CLIMATIC REQUIREMENTS	16
3.2.10	LUBRICATION	16
3.2.11	STANDARD PARTS	16
3.2.12	CREW	16
3.2.13	EQUIPMENT INSTALLATION	16
3.2.14	EQUIPMENT AND FURNISHINGS INSTALLATION	16
3.3	AERODYNAMICS	17
3.3.1	GENERAL	17
3.3.2	STABILITY AND CONTROL	17
3.4	STRUCTURAL DESIGN CRITERIA	18
3.4.1	LIMIT FLIGHT LOAD FACTORS	18
3.4.2	LIMIT GROUND LOAD FACTORS	18

SECRET
SECURITY INFORMATION

TABLE OF CONTENTS

3.4.3 LIMIT DIVING SPEED 18

3.5 WING GROUP 19
3.5.1 DESCRIPTION AND COMPONENTS 19
3.5.2 CONSTRUCTION 19
3.5.3 ELEVONS 19
3.5.4 LIFT AND DRAG INCREASING DEVICES 19

3.6 TAIL GROUP 20
3.6.1 DESCRIPTION AND COMPONENTS 20
3.6.2 STABILIZER 20
3.6.3 ELEVATOR 20
3.6.4 FIN 20
3.6.5 RUDDER 20

3.7 BODY GROUP 21
3.7.1 FUSELAGE 21
3.7.2 HULL 22

3.8 ALIGHTING GEAR 23
3.8.1 GENERAL DESCRIPTION AND COMPONENTS 23
3.8.2 MAIN LANDING GEAR 23
3.8.3 AUXILIARY LANDING GEAR (Tail Wheel)........ 24
3.8.4 AUXILIARY LANDING GEAR (Nose Wheel) 24

3.9 ALIGHTING GEAR (Water Type) 25

3.10 SURFACE CONTROL SYSTEM 26
3.10.1 PRIMARY FLIGHT CONTROL SYSTEM 26
3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS 26
3.10.3 TRIM CONTROL SYSTEMS 26
3.10.4 AUTOMATIC FLIGHT CONTROL INSTALLATION... 26

3.11 ENGINE SECTION 27
3.11.1 DESCRIPTION AND COMPONENTS 27
3.11.2 CONSTRUCTION 27
3.11.3 ENGINE MOUNTS 27
3.11.4 VIBRATION ISOLATORS 27
3.11.5 FIRE WALLS 27
3.11.6 COWLING AND COWL FLAPS 28
3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE... 28

TABLE OF CONTENTS

3.12 PROPULSION 28
3.12.1 GENERAL DESCRIPTION AND COMPONENTS 28
3.12.2 MAIN PROPULSION UNIT 28
3.12.3 AUXILIARY PROPULSION UNIT 29
3.12.4 ENGINE-DRIVEN ACCESSORIES 29
3.12.5 AIR INDUCTION SYSTEM 29
3.12.6 EXHAUST SYSTEM 29
3.12.7 COOLING SYSTEM 29
3.12.8 LUBRICATING SYSTEM 29
3.12.9 FUEL SYSTEM 30
3.12.10 WATER INJECTION SYSTEM 31
3.12.11 PROPULSION SYSTEM CONTROLS 31
3.12.12 STARTING SYSTEM 31
3.12.13 PROPELLER 31
3.12.14 ROCKET PROPULSION SYSTEM 31

3.13 AUXILIARY POWER PLANT 32

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT 33
3.14.1 INSTRUMENTS 33
3.14.2 NAVIGATION EQUIPMENT 33
3.14.3 INSTALLATION 33

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS 34
3.15.1 HYDRAULIC SYSTEM 34
3.15.2 PNEUMATIC SYSTEMS 34

3.16 ELECTRICAL 36
3.16.1 DESCRIPTION 36
3.16.2 ELECTRICAL POWER SUPPLY 36
3.16.3 ELECTRICAL POWER CONVERSION 37
3.16.4 EQUIPMENT INSTALLATION 37
3.16.5 WIRING 37
3.16.6 BONDING 37
3.16.7 CONTROLS 37
3.16.8 LIGHTING 38
3.16.9 IGNITION AND STARTING CONTROL SYSTEM 38
3.16.10 RECEPTACLES 38
3.16.11 INDICATORS 39

TABLE OF CONTENTS

3.16.12 ELECTRIC DRIVES 40
3.16.13 RELAYS 40
3.16.14 BOOSTER COIL 40
3.16.15 FILTERS 40

3.17 ELECTRONICS 41
3.17.1 LIST OF EQUIPMENT 41
3.17.2 COMMUNICATION EQUIPMENT 42
3.17.3 NAVIGATION EQUIPMENT 43
3.17.4 RADAR 45
3.17.5 ELECTRONIC COUNTERMEASURE 45
3.17.6 ELECTRONIC GUIDANCE SYSTEM 46
3.17.7 STATIC DISCHARGERS 46
3.17.8 EMERGENCY RESCUE TRANSMITTER 46
3.17.9 RADOME 46

3.18 ARMAMENT 47
3.18.1 DESCRIPTION 47
3.18.2 FIXED GUNS 47
3.18.3 ROCKETS AND MISSILES 47
3.18.4 FLEXIBLE GUNS 48
3.18.5 STORES 48
3.18.6 PASSIVE DEFENSE 48

3.19 FURNISHINGS AND EQUIPMENT 49
3.19.1 ACCOMMODATIONS FOR PERSONNEL 49
3.19.2 MISCELLANEOUS EQUIPMENT 49
3.19.3 FURNISHINGS 50
3.19.4 EMERGENCY EQUIPMENT 50
3.19.5 OXYGEN EQUIPMENT 50
3.19.6 EMERGENCY RESCUE EQUIPMENT 50

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT.. 51
3.20.1 AIR CONDITIONING 51
3.20.2 ANTI-ICING 52

3.21 PHOTOGRAPHIC 54

3.22 AUXILIARY GEAR 55
3.22.1 TOWING PROVISIONS 55
3.22.2 JACKING PROVISIONS 55

SECRET
SECURITY INFORMATION

TABLE OF CONTENTS

3.22.3 MOORING PROVISIONS 55
3.22.4 HOISTING PROVISIONS 55
3.22.5 LEVELING 55
3.22.6 COVERS AND SHIELDS 55
3.22.7 SPECIAL TOOLS 56

4. SAMPLING, INSPECTION AND TEST PROCEDURES. 57

5. PREPARATION FOR DELIVERY 57

6. NOTES 58

6.1 EXPLANATORY INFORMATION 58
6.2 ADDITIONAL INFORMATION 58
6.3 DEFINITIONS 58
6.3.1 COMPLETE PROVISION FOR 58
6.3.2 STRUCTURAL PROVISIONS FOR 58
6.3.3 SPACE PROVISIONS FOR 58
6.3.4 OTHER DEFINITIONS 58

APPENDIX 1-A
GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT-CONTRACTOR INSTALLED 59

APPENDIX 1-B
GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT-GOVERNMENT INSTALLED 64

APPENDIX 1-C
CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT-CONTRACTOR INSTALLED 65

APPENDIX II
DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS 70

SECRET
SECURITY INFORMATION

SECRET
SECURITY INFORMATION

TABLE OF CONTENTS

Illustrations

Figure 1 General Arrangement - YF-102 Intercepter 3
Figure 2A Performance Summary 6
Figure 2B Limit Dive Speeds vs Altitude 6
Figure 3 Center of Gravity Envelopes 11
Figure 4 Cabin Pressurization Schedule 53

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SECURITY INFORMATION

1. SCOPE AND CLASSIFICATION:

1.1 This specification covers the following airplane:

Service Model Designation	YF-102
Consolidated Vultee Aircraft Corporation Model	8
Number and Places for Crew	One pilot
Number and Kind of Engine	One turbo-jet

1.1.1 The primary mission of this airplane is the interception and destruction of attacking enemy aircraft and airborne missiles which fall within the performance capabilities of the aircraft, its armament and the associated electronics equipment under all conditions of weather and visibility and to fulfill the requirements for general, local, and free lance defense operations for aircraft of this type.

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS:

2.1 Applicable specifications listed in the Index of Specifications and Bulletins Approved for Air Force Procurement, dated 1 July 1950, including Supplements through 1 September 1950, shall form a part of this specification.

2.2 The applicable requirements of the following publications with dates as listed below form a part of this specification:

Air Force Specification No. 1800-E, dated 18 May 1944 and Amendment No. 5 dated 28 May 1945.

Handbook of Instructions for Aircraft Designers, Ninth Edition, including revisions up to and including 1 April 1950.

Request for Proposal AMC Letter MCREOA-4/WRR/bmm, dated 1 September 1950.

Pratt and Whitney Engine Specification No. A-1637. ✓

Continental Gas Turbine Compressor Specification No. 2051, dated 14 February 1952.

Classification changed to: **CONFIDENTIAL**
Authorized by: DD254 Date 10/15/55

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SECURITY INFORMATION

Reclassified by: Dept. 6 Date 1/16/56

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS (Cont)

Convair Gas Turbine Compressor Modification Specification No. ZK-8-003.

Hughes Aircraft Corporation Specification for the MX-1179 Equipment.

2.3 All other applicable specifications and drawings referenced herein, but not by revision letter, date or amendment, shall be of the issue in effect on 1 September 1950. SEE PAGES 120 THRU 127

3. REQUIREMENTS:

3.1 CHARACTERISTICS:

3.1.1 THREE VIEW DRAWINGS: (See page 3)

[redacted]

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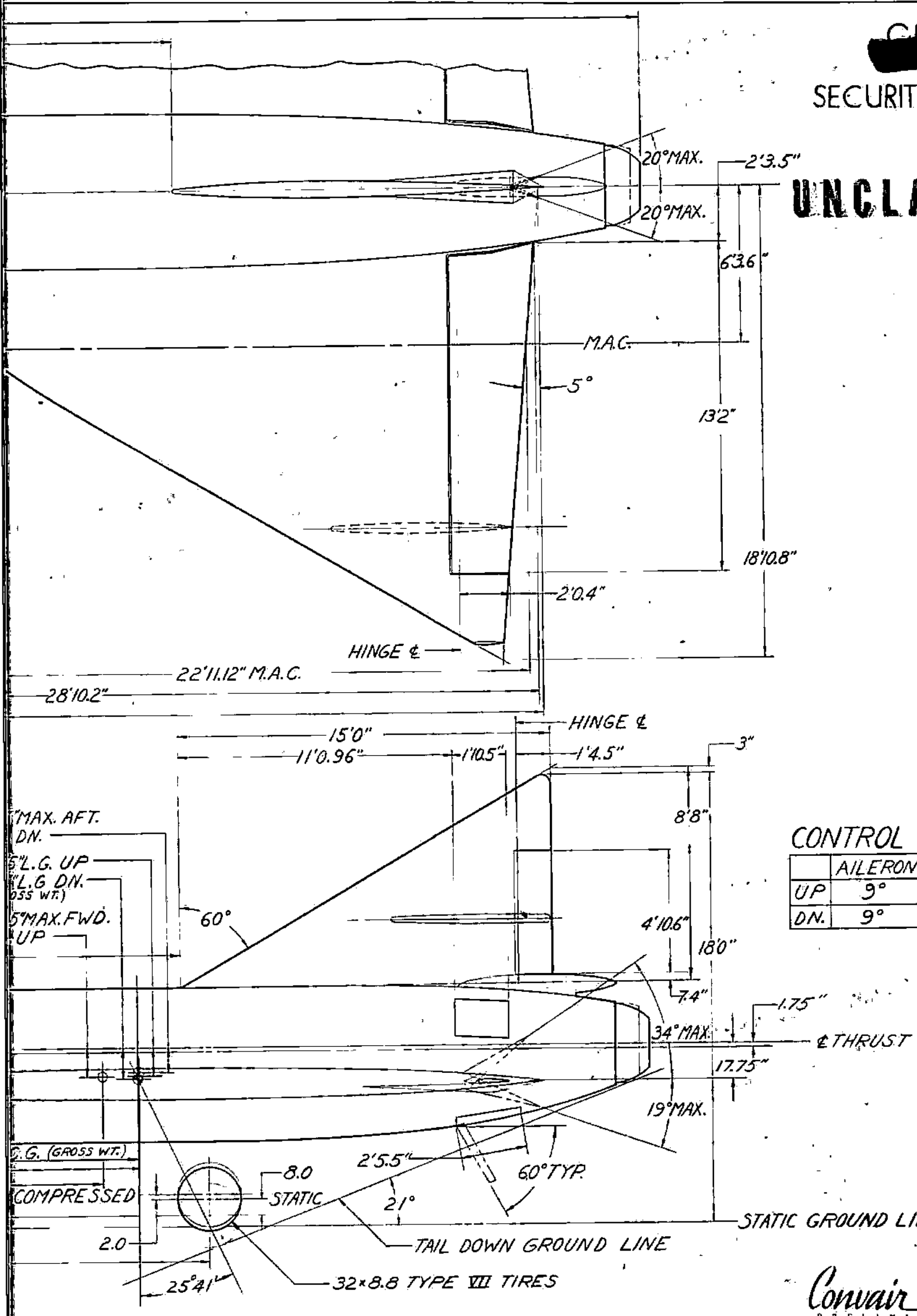


CONTROL SURFACES DATA:

	AILERON	ELEVATOR	TOTAL
UP	9°	25°	34°
DN.	9°	10°	19°

Convair
PRELIMINARY DESIGN DRAWING

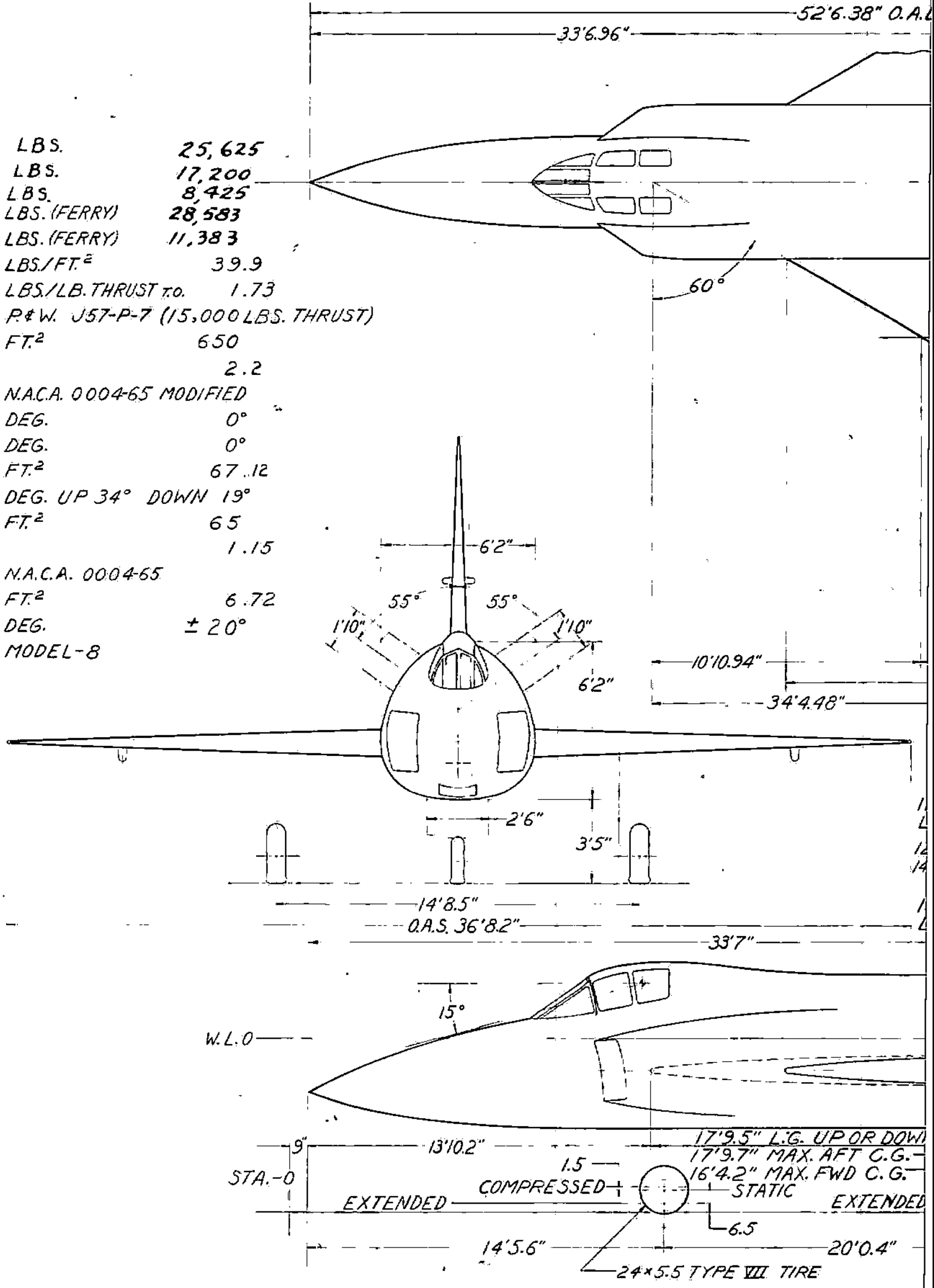
GENERAL ARRANGEMENT
YF-102 INTERCEPTOR

R.G. WILCOX | CHECKED | APPROVED | SCALE 1-20TH | DATE 4-1
CONSOLIDATED VULTEE AIRCRAFT CORPORATION
SAN DIEGO CALIFORNIA
8-00001

FIGURE 1

DATA:

ULL LOAD GROSS WT	LBS.	25,625
WEIGHT EMPTY	LBS.	17,200
USEFULL LOAD	LBS.	8,425
ALTERNATE GROSS WT.	LBS. (FERRY)	28,583
ALTERNATE USEFULL LOAD	LBS. (FERRY)	11,383
ING LOADING	LBS./FT.²	39.9
HRUST LOADING	LBS./LB. THRUST T.O.	1.73
NGINE MODEL DESIGNATION	P&W. J57-P-7 (15,000 LBS. THRUST)	
ING AREA	FT.²	650
ASPECT RATIO		2.2
AIRFOIL	N.A.C.A. 0004-65 MODIFIED	
DIHEDRAL	DEG.	0°
INCIDENCE	DEG.	0°
LERONS AREA TOTAL	FT.²	67.12
DEFLECTION	DEG. UP 34° DOWN 19°	
ERTICAL TAIL AREA	FT.²	65
ASPECT RATIO		1.15
AIRFOIL	N.A.C.A. 0004-65	
UDDER AREA	FT.²	6.72
DEFLECTION	DEG.	± 20°
ANUFACTURES MODEL NO.	MODEL-8	



3. REQUIREMENTS (Cont)

3.1.2 PERFORMANCE:

3.1.2.1 **ESTIMATED-TABULATED PERFORMANCE:** The performance of the airplane at combat weight (22,895 lb), unless otherwise specified, is estimated to be as follows. Combat radius based on 30 seconds warm-up at military power, 15 minutes loiter at 35,000 feet, and reserve fuel for additional flight around blind landing pattern. Ferry flight range based on Specification No. MIL-C-5011A.

High speed with military plus afterburner power		
35,000 feet	Mach No.	1.43
40,000 feet	Mach No.	1.35
Combat radius with 1050 gal normal fuel, cruise Mach No. = 0.9 @ 45,000 feet, combat with Military plus afterburner power @ 10,000 feet @ 85% V_{max}		
1.0 min combat	Naut Mi	675
4.5 min combat	Naut Mi	375
(Combat radii are longer for combat at higher altitude)		
Combat ceiling, with Military plus afterburner power (500 ft/min rate of climb)	Feet	55,600
Time to climb to altitude, with Military plus afterburner power		
40,000 feet	Minutes	2.6
50,000 feet	Minutes	4.6
Take-off without auxiliary take-off devices over 50-foot obstacle with Military plus afterburner power, take-off weight 25,652 pounds	Feet	2,460

3. REQUIREMENTS (Cont)

Land without auxiliary landing devices over 50-foot obstacle with weight at end of mission	Feet	3,450 @ 18,930 lb
Ferry flight range (1550 gal fuel)	Naut Mi	2,330

The above performance is based upon flight of the airplane in NACA standard atmosphere with all doors closed, except for landing and take-off, all antennas submerged or flush, using the engine and power ratings specified in Paragraph 3.12.2.1.

3.1.2.2 ADDITIONAL ESTIMATED PERFORMANCE CURVES: (See Figure 2A, page 6.)

3.1.2.3 The performance specified herein is based on the specific fuel consumptions specified in engine manufacturer's specifications shown in Paragraph 3.12.2.1, increased by 5%.

3.1.3 WEIGHTS: For estimated weights see Group Weight Statement - AN9103 on pages 7, 8 and 9.

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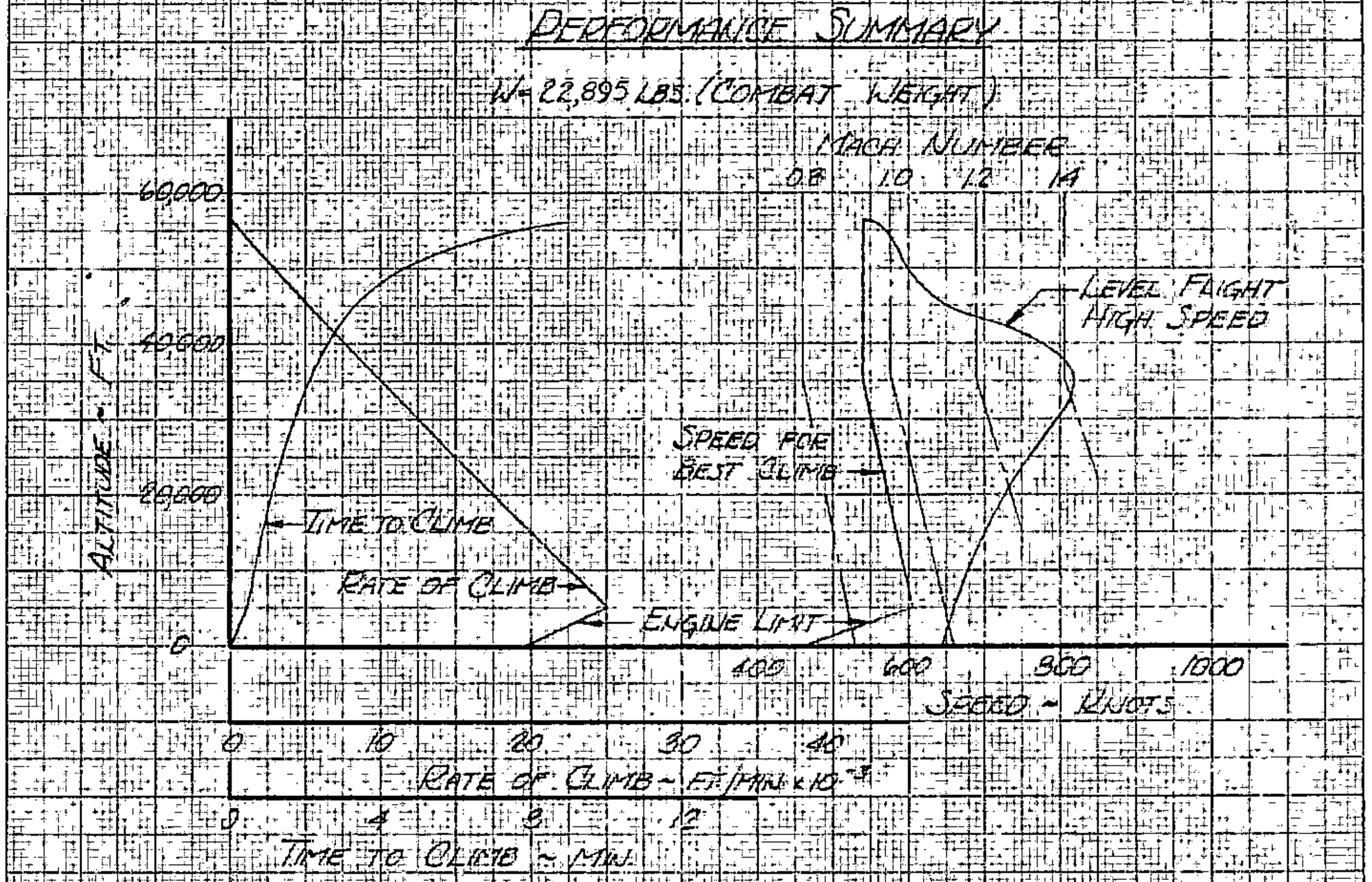

Figure 2A

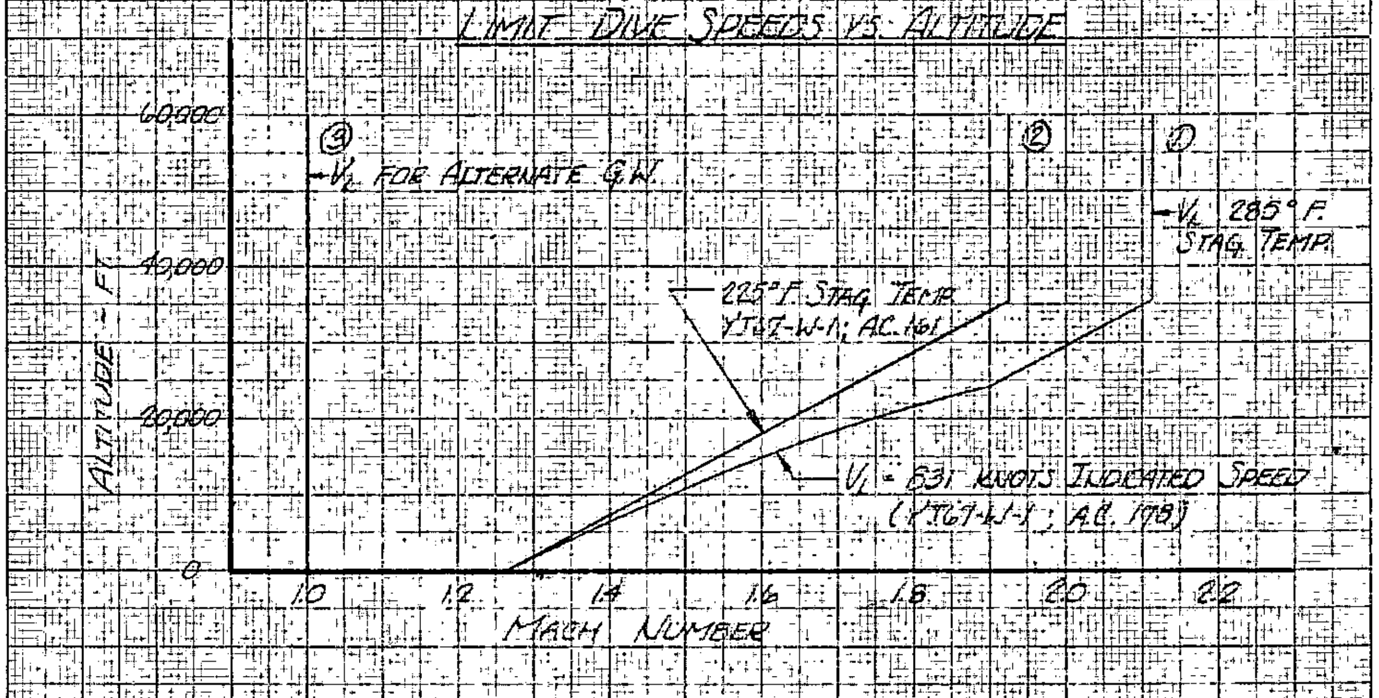

Figure 2B

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KEUFFEL & ESSER CO. 359-14G
Millimeters, 6 mm. lines accented, cm. lines heavy.
MADE IN U.S.A.

AN-9103-C

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT

PAGE 7
MODEL YF-102
REPORT ZD-8-001

CODE NO.			PROVISIONS FOR EQUIPMENT	STRUCTURE	LANDPLANE or SEAPLANE
1	WING GROUP		(216.7)	(2765.3)	2,982
2	CENTER SECTION (OR UPPER CENTER)				
3	INTERMEDIATE PANEL (OR UPPER OUTER)				
4	OUTER PANEL (OR LOWER CENTER)		209.1	2402.1	
5	TIPS (OR LOWER OUTER)			52.0	
6	AILERONS (COUNTER BALANCE WT. LBS.)		14.8	311.2	
7	FLAPS				
8	SLATS				
9					
10	TAIL GROUP		(74.0)	(291.0)	365
11	STABILIZER				
12	ELEVATOR (COUNTER BALANCE WT. LBS.)				
13	FIN		74	259	
14	RUDDER (COUNTER BALANCE WT. LBS.)			32	
15					
16	BODY GROUP				2,723
17	FUSELAGE OR GONDOLA - LESS ENG. SECTION				
18	BOOMS				
19	HULL				
20	ALIGHTING GEAR - LAND TYPE				1,259
21	MAIN LANDING GEAR			985	
22	AUXILIARY LANDING GEAR (NOSE OR TAIL WHEEL)			274	
23	BUMPER (WHEEL OR SKID)			--	
24					
25	ALIGHTING GEAR - WATER TYPE				
26	MAIN FLOATS				
27	AUXILIARY FLOATS				
28	ENGINE SECTION or NACELLE GROUP				
29	INNER				
30	CENTER				
31	OUTER				
32					
33	POWER PLANT GROUP				6,039
34	ENGINE (AS INSTALLED)			4825	
35	ENGINE ACCESSORIES			836	
36	POWER PLANT CONTROLS			17	
37	PROPELLERS				
38	STARTING SYSTEM			46	
39					
40	COOLING SYSTEM				
41	RADIATORS & SHUTTERS				
42	LIQUID				
43	PIPING ETC.				
44	Auxiliary Oil Cooling System			36.3	
45	TANKS AND PROTECTION				
46	PIPING ETC.				
47	FUEL SYSTEM			278.3	
48	TANKS AND PROTECTION	0			
49	PIPING ETC.	278.3			
50	TOTALS (TO BE BROUGHT FORWARD)				13,368

AN-9103-C

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT (Contd.)

PAGE 8
MODEL YF-102
REPORT ZD-8-001

CODE NO.				LANDPLANE or SEAPLANE
1	FIXED EQUIPMENT GROUP			3,832
2	INSTRUMENTS		100	
3	SURFACE CONTROLS		410	
4	HYDRAULIC SYSTEM		446	
5	ELECTRICAL		443	
6	Electronics		1445	
7	ARMAMENT PROVISIONS (INCLUDING GUNFIRE PROTECTION)		360	
8	FURNISHINGS		518	
9	PERSONNEL ACCOMMODATIONS			
10	EMERGENCY ACCOMMODATIONS			
11	PROVISIONS FOR FLIGHT			
12	AIR CONDITIONING EQUIPMENT			
13	ANTI-ICING EQUIPMENT		80	
14	AUXILIARY POWER PLANT		6	
15	AUXILIARY GEAR		24	
16	ANCHOR, TOWING & HOISTING GEAR			
17	ARRESTING GEAR INSTALLATION			
18	EMERGENCY FLOTATION GEAR			
19	SERVICE PICKUP			
20	TOTALS (FROM PAGE 2.0)			13,368
21	WEIGHT EMPTY			17,200

UNIT WEIGHTS

WING GROUP (GROSS AREA 650 SQ.FT.) LBS. PER SQ.FT.	4.5
TAIL GROUP (GROSS AREA 65 SQ.FT.) LBS. PER SQ.FT	5.62
SUBMERGED DISP. MAIN FLOATS OR HULL ( )	
WEIGHT OF MAIN FLOATS AND BRACING ( )	
WEIGHT OF COOLING SYSTEM PER NORMAL H.P. (H.P.)	
WEIGHT OF LUBRICATING SYSTEM PER GAL. OIL CAP. (3 GAL. OF OIL)	12.1
WEIGHT OF FUEL SYSTEM PER GAL. CAP. (1050 GAL. OF FUEL)	.265

DESIGN INFORMATION

LENGTH - MAX.	52'6"	MAXIMUM FUSELAGE DEPTH	6'2"
HEIGHT - MAX.	18'	MAXIMUM FUSELAGE WIDTH	6'2"
SPAN	37'9.6"	DESIGN GROSS WEIGHT	25,625
THICKNESS ROOT CHORD	4%	GROSS WEIGHT FOR STRESS ANALYSIS	22,895
THICKNESS TIP CHORD			
WING AREA - NET			
LOAD FACTOR - ULTIMATE	See Report ZU-8-003		
TAPER RATIO (ROOT CHORD/TIP CHORD)	Delta		
LENGTH ROOT CHORD	34'4.7"	TOTAL BULLET PROOF GLASS	122 POUNDS
LENGTH TIP CHORD	0	TOTAL ARMOUR PLATE	POUNDS

REMARKS

"PROVISIONS FOR" CAN BE INTERPRETED AS FOLLOWS:

1. ALL PARTS ASSEMBLED TO ONE BASIC UNIT FOR THE SOLE PURPOSE OF PRODUCING A SUPPORT OR MOUNT FOR EQUIPMENT OR STRUCTURAL UNITS OF ANOTHER BASIC GROUP.
2. IF THE CONTRACTOR'S SYSTEM OF WEIGHT BREAKDOWN INCLUDES ITS PROVISIONS WITH THE BASIC GROUPS, THEN WEIGHTS ORDINARILY ENTERED ON PAGES TITLED "INSTALLATION PROVISIONS FOR" ARE NOT REQUIRED.

SERVICE PICK-UP DOES NOT INCLUDE ENTRAPPED FUEL & OIL

AN-9103-C

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT (Contd.)

MODEL YF-102
REPORT ZD-8-001

	USEFUL LOAD		Ferry		
	LOAD CONDITION	LANDPLANE (SPEC.)	[redacted]	LANDPLANE (ACTUAL)	SEAPLANE (ACTUAL)
1	CREW (NO. 1)	230	230		
2					
3	PASSENGERS (NO.)				
4	FUEL - ENGINE (1050 GALS.)	6,825	6,825		
5	FUEL - TRAPPED IN SYSTEM (GALS.)	60	60		
6	FUEL - AUXILIARY POWER PLANT (GALS.)				
7	OIL - ENGINE (3 GALS.)	25	25		
8	OIL - TRAPPED IN SYSTEM (GALS.)	25	25		
9	OIL - AUXILIARY POWER PLANT (GALS.)				
10	OIL - SUPERCHARGER (GALS.)				
11	OIL - REDUCTION GEAR BOX (GALS.)				
12	BAGGAGE				
13	Ferry Tank Installation		750		
14	~~CARGO~~ Ferry Fuel (500 gal)		3,250		
15					
16	ARMAMENT	(1,242)			
17	MX-904 Missiles	750			
18	CAL. GUN INSTALLATION Missile launchers	60			
19	CAL. AMMUNITION				
20	CAL. GUN INSTALLATION Rockets (24)	432			
21	CAL. AMMUNITION				
22	MM. CANNON INSTALLATION				
23	MM. AMMUNITION				
24					
25					
26	GUN SIGHTS				
27	FLEXIBLE GUNS (TOTAL)				
28	CAL. GUN INSTALLATION				
29	CAL. AMMUNITION				
30	CAL. GUN INSTALLATION				
31	CAL. AMMUNITION				
32	MM. CANNON INSTALLATION				
33	MM. AMMUNITION				
34					
35					
36	BOMB INSTALLATION				
37					
38					
39	TORPEDO INSTALLATION				
40					
41					
42	EQUIPMENT				
43	NAVIGATION				
44	OXYGEN				
45	PHOTOGRAPHIC				
46	PYROTECHNICS				
47	MISCELLANEOUS Life Raft	18	18		
48	APU		200		
49					
50	USEFUL LOAD	8,425	11,383		
51	WEIGHT EMPTY	17,200	17,200		
52	GROSS WEIGHT	25,625	28,583		

6

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3. REQUIREMENTS (Cont)

3.1.3.1	Alternate Loading (Ferry condition)	Lb	28,583
3.1.3.2	Take-Off Gross Weight (Airborne)	Lb	25,140

3.1.4 CENTER OF GRAVITY LOCATIONS:

Take-off gross weight, center of gravity location, wheels up:

Aft leading edge of MAC	% MAC	30.1
Above leading edge of MAC	Inches	6.7

Take-off gross weight, center of gravity location, wheels down:

Aft leading edge of MAC	% MAC	30.2
Above leading edge of MAC	Inches	5.3

Extreme positions of center of gravity possible in flight at weights indicated

	Most Fwd		Most Aft	
	% MAC	Above Leading Edge MAC (In.)	% MAC	Above Leading Edge MAC (In.)
Wheels Up	24.9	8.4	---	---
Wheels Down	---	---	30.4	7.5
Weight	18,800 lb *		19,503 lb **	

* Point (1) on Curve of page 11.
** Point (2) on Curve of page 11.

3.1.4.1 See Figure 3, page 11, for chart of Center of Gravity Limitations.

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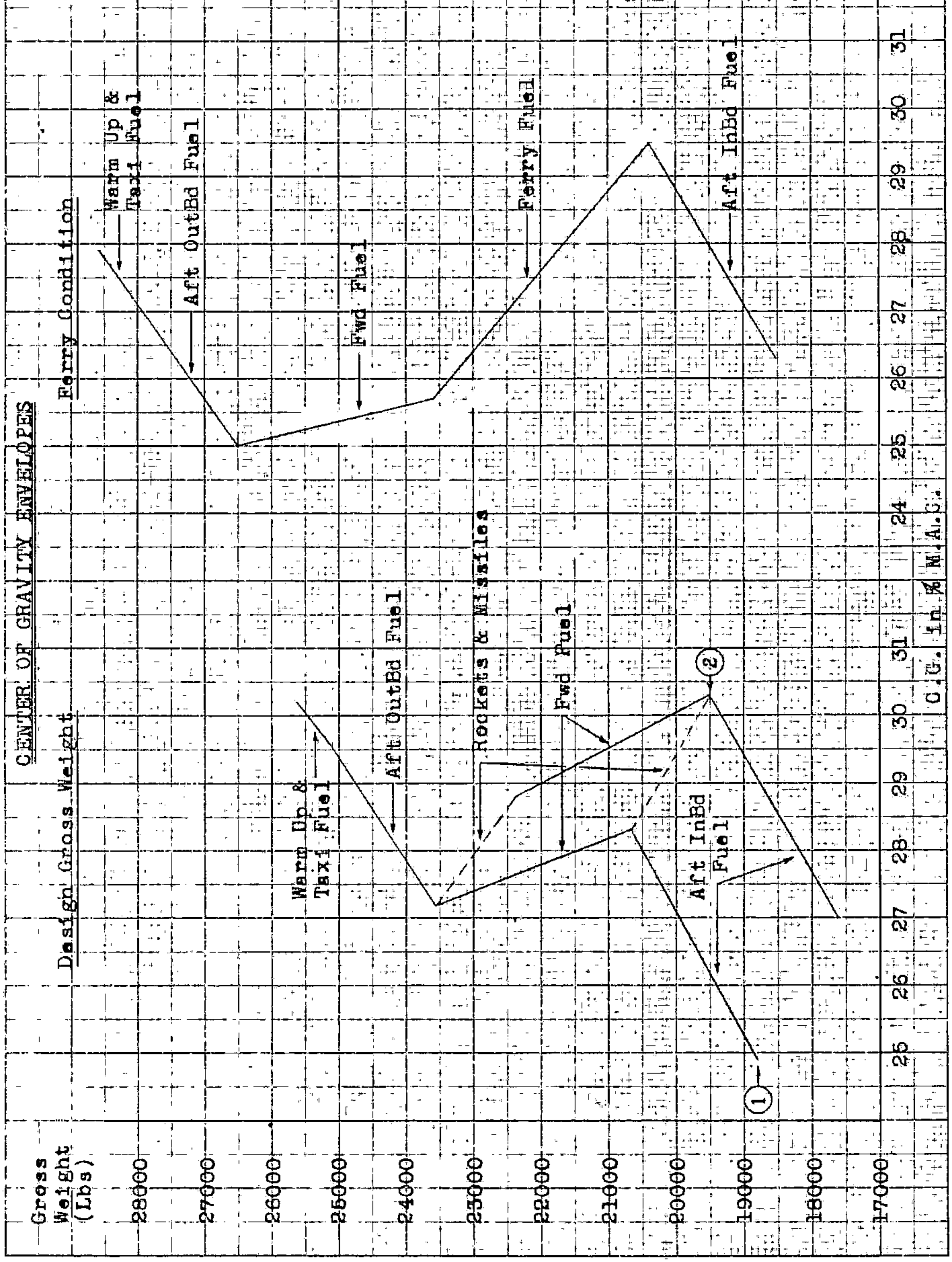

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FIGURE 3

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3. REQUIREMENTS (Cont)

3.1.5 AREAS (Not to be used for inspection purposes):

Wing area, total, including elevons	650 sq ft
Elevon area, aft of hinge line	67.12 sq ft
Vertical Tail area, total	65 sq ft
Fin	58.28 sq ft
Rudder, aft of hinge	6.72 sq ft

3.1.6 ① DIMENSIONS AND GENERAL DATA (Not to be used for inspection purposes):

Wing	
Span, maximum (theoretical)	37 ft 9.6 in.
Chord	
At root	34 ft 4.7 in.
At tip (theoretical)	0
Mean aerodynamic	22 ft 11.1 in.
Airfoil section	
Designation	NACA 0004-65(Mod)
Thickness (percent chord)	4
Incidence (degrees)	
At root	0
At tip	0
Sweepback of leading edge	60 degrees
Dihedral	0 degrees
Aspect ratio	2.2
Elevons	
Span, each	13 ft 2 in.
Chord	
Tip	2 ft 0.4 in.
Root	3 ft 2.2 in.
Tail	
Vertical	
Airfoil section	
Designation	NACA 0004-65(Mod)
Thickness (percent chord)	4
Sweepback of leading edge	60 degrees
Aspect ratio	1.15

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3. REQUIREMENTS (Cont)

Height over vertical tail	
Reference line level	18 ft 0 in.
Three-point position	18 ft 0 in.
Length, maximum	52 ft 6 in.
Distance from 25% MAC to rudder 25% chord line	17 ft 0. 5 in.
Ground angle	21 degrees
Wheel rim size	
Main wheels	16 inches
Nose wheel	14 inches
Tire size	
Main wheels	32 x 8. 8
Nose wheel	24 x 5. 5
Tread of main wheels	14 ft 8. 5 in.
Wheelbase	20 ft 0. 4 in.
Vertical travel of axle from extended to fully compressed position	
Main wheels	10 inches
Nose wheel	8 inches
Angle between lines joining center of gravity with points of contact of main wheel tires, static deflection of 1W (front elevation)	51°04'
Angle of line through center of gravity and ground contact point of main wheel tire to vertical line, reference line level, static deflection of 1W (side elevation)	25°41'

3. REQUIREMENTS (Cont)

3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS (Not to be used for inspection purposes): Control surface and control movements on each side of neutral position for full movement as limited by stops, are as follows:

Rudder	20° right	20° left
Rudder pedals	3.25" fwd	3.25" aft
Elevons (as elevators)	25° up	10° down
Elevon Control (stick)	5" fwd	9" aft
Elevons (as ailerons)	9° up	9° down
Elevon Control (stick)	7" right	7" left
Speed brakes	60° maximum travel	

3.2 GENERAL:

3.2.1 GENERAL INTERIOR ARRANGEMENT: The interior of the fuselage shall be arranged from nose to tail to provide the following:

(a) A nose section consisting of a radome to house the radar antenna and radar equipment portion of MX-1179.

(b) A pressurized pilot's compartment with seat, controls and equipment. A section to house the nose wheel in the retracted position is located below the floor of this compartment.

(c) A section to accommodate the communication, navigation and primary electrical supply components of the MX-1179 equipment.

(d) An armament section to house the missiles and rockets, and their displacing gear. This section will also contain the electrical power supply and refrigeration equipment. Through this bay passes the forward wing spar.

(e) A section to accommodate one turbo-jet engine with wells in the lower portion to house the main landing gear in the retracted position. Through this section pass the wing main and rear spars.

3. REQUIREMENTS (Cont)

(f) An aft compartment containing the engine tail pipe, control system valves and linkages, and speed brakes.

3.2.2 ③ (85) (60) MATERIALS: Materials shall be in accordance with applicable specifications and shall be selected in accordance with ANA Bulletin 143, except as otherwise noted herein and in Appendix II.

3.2.3 WORKMANSHIP: Workmanship shall conform to high grade aircraft practice as defined by the Contractor's quality control procedures.

3.2.4 PRODUCTION, MAINTENANCE AND REPAIR: In the design of the airplane, consideration shall be given to ease of production, rapid power plant and equipment installation and ease of servicing and maintenance. Special attention shall be given to simplification of accessibility for routine checks of equipment and provisions for general field maintenance at advance bases where elaborate ground equipment is not usually available. Servicing provisions shall be designed to permit maximum utilization of the airplane under combat conditions. Special tools shall be limited to the practicable minimum and shall conform to Specification No. AN-D-17.

3.2.5 INTERCHANGEABILITY AND REPLACEABILITY: The component parts of the airplanes shall be interchangeable or replaceable, as the case may be, in accordance with and to the extent required by Specification No. AN-I-21, and shall be manufactured in conformity with the provisions of such specification, except as noted otherwise in Appendix II herein.

3.2.6 FINISH: The finish for the airplane and parts shall be in accordance with the Contractor's finish specification which shall be in general accordance with Specification No. 3-100J. In general, exterior and interior paint is not required.

3.2.7 IDENTIFICATION AND MARKING: The airplane and components thereof shall be identified and otherwise marked in accordance with Specifications No. AN-M-13a(1) and 98-24105S(3).

3.2.8 EXTREME TEMPERATURE OPERATION: The aircraft as a whole, including aeronautical equipment, shall be so constructed that it will function satisfactorily in any or all temperature conditions that will be encountered. A ground temperature of -65°F has been established as the minimum temperature at which the aircraft shall operate. See curve on page 6 for maximum operating temperature.

3. REQUIREMENTS (Cont)

3.2.9 CLIMATIC REQUIREMENTS: The aircraft and its equipment shall not be adversely affected by other climatic conditions incident to the above temperature range, and shall be capable of transfer from one climate to another without penalty of extensive modification and adjustment.

3.2.10 LUBRICATION: Lubrication of the airplane shall be in accordance with Specification No. MIL-L-6880.

3.2.11 STANDARD PARTS: The use of standard parts shall be in accordance with the requirements of Paragraph 3.2.2.

⑱ thru ㉑

3.2.11.1 Bearings shall meet the requirements of the applicable revision of the Handbook of Instructions for Aircraft Designers, except as noted in the specifications for bearings listed in Air Force Bulletin No. 59, dated 1 January 1951.

3.2.12 CREW: The crew shall consist of one pilot.

3.2.13 EQUIPMENT INSTALLATION:

3.2.13.1 ARMAMENT: Complete provisions shall be made for mounting and firing the following weapons:

Rocket -	2.75" FFAR	24
Guided Missile -	MX-904	6

3.2.13.2 COMMUNICATION AND NAVIGATION EQUIPMENT: Part of Hughes Electronic and Control System (MX-1179).

3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION: The equipment and furnishings listed in Appendices I-A, I-B and I-C of this model specification, and as may be described in other portions of this model specification, shall be installed in the quantity and under the conditions specified herein.

3. REQUIREMENTS (Cont)

3.3 AERODYNAMICS:

(105) (106)

3.3.1 GENERAL: The airplane shall be designed and constructed to provide the maximum surface smoothness and trueness of aerodynamic contour that are consistent with rapid and economical manufacturing techniques and that are required for high performance.

3.3.2 STABILITY AND CONTROL:

3.3.2.1 The stability and controllability of the airplane shall be in accordance with Specification No. 1815B, except as noted in Appendix II.

(94) thru (103)

3.3.2.2 PERMISSIBLE AERODYNAMICS CENTER OF GRAVITY LIMITS: The aerodynamic limit at take-off shall be as shown on the curve of page 11. If equipment or armament is omitted, equivalent ballast shall be carried.

3.3.2.3 It shall be possible to open the speed brakes in three seconds from fully closed position to the position corresponding to 90% of nominal hydraulic system force, which corresponds to 2700 psi in the actuating cylinder. It shall be possible to open the speed brakes to any intermediate position.

3.3.2.4 The longitudinal deceleration provided by the speed brakes shall be at least 0.3g at 400 knots IAS and shall not be required to exceed 0.5g at any higher speed.

3. REQUIREMENTS (Cont)

② ④ thru ⑫ ㉓ ㉖ ㉗ ㉙ ㉚ (86)

3.4 **STRUCTURAL DESIGN CRITERIA:** Stress analysis criteria shall be as set forth in Convair Report No. ZU-8-003. (All structural limitations are predicated on the eventual installation of the YJ67-W-1 engine.)

3.4.1 LIMIT FLIGHT LOAD FACTORS:

3.4.1.1 Structural Design Gross Weight .... 22,895 lb

Maneuver: Positive 5.33 * Negative -3.0

3.4.1.2 Maximum Alternate Weight (Ferry Condition) .... 28,583 lb

Maneuver: Positive 3.0 Negative -1.0

3.4.1.3 Minimum Flying Weight .... 17,795 lb

3.4.2 LIMIT GROUND LOAD FACTORS:

Taxiing:

Ground Maneuver @ Take-off (at take-off gross weight of 28,583 lb) 2

Landing:

Ground Landing (at take-off with maximum alternate weight of 28,583 lb) .... 2.0 (approx)

Ground Landing (at landing weight of 21,524 lb). 3.0 (approx)

3.4.3 **LIMIT DIVING SPEED:** See Figure 2B, page 6, for limit diving speeds. The limit dive speed for structural design is as indicated by curve 1. A placard (red light) will be placed on the airplane to actuate at the limit established by curve 2, which corresponds to a stagnation temperature of 225°F. The characteristics of certain special materials such as windshield glass (vinyl separation), integral fuel tank sealing materials, etc., are such that they may limit the usable maximum speed. Determination of the usable maximum speed can only be made through a process of flight testing, at which time curve 2 can be raised. Curve 3 shows the maximum Mach No. for design in the "Ferry" condition and is above the speed for maximum range.

(* At elevated temperatures - approximately 7.0 cold)

3. REQUIREMENTS (Cont)

3.5 WING GROUP:

3.5.1 (51) **DESCRIPTION AND COMPONENTS:** The wing shall be a delta wing in planform and shall include two elevons, integral fuel tanks and provisions for attachment of main landing gear and other equipment.

3.5.2 CONSTRUCTION:

3.5.2.1 The wing shall be basically of full cantilever, stressed skin, high strength aluminum alloy construction employing spanwise spars of built-up shear-web type and chordwise ribs and bulkheads.

3.5.2.2 A portion of the wing interspar area outboard of the fuselage shall be designed for integral fuel tanks.

3.5.2.3 The wing leading edges shall be designed for thermal anti-icing.

3.5.2.4 Wing tips shall be removable.

3.5.3 **ELEVONS:** Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be of riveted metal torque box and rib construction with metal covering.

Differential motion (as ailerons)	None
Distance from plane of symmetry to centroid of elevon area	8 ft 7 in.
Type of balance	None
Tabs	None

3.5.4 **LIFT AND DRAG INCREASING DEVICES:** None included as a portion of the Wing Group. See paragraphs 3.6.4.1 and 3.7.1.6.

3. REQUIREMENTS (Cont)

3.6 TAIL GROUP:

3.6.1 DESCRIPTION AND COMPONENTS: The tail group shall consist of a single vertical fin and rudder.

3.6.2 STABILIZER: Not applicable.

3.6.3 ELEVATOR: Not applicable.

3.6.4 FIN: The fin shall be basically of riveted cantilever, high strength aluminum alloy construction attached to the fuselage and including provision for attachment of the rudder. The structure shall consist of spars and ribs with stressed metal covering. The leading edge shall be designed for thermal anti-icing. The tip shall be electrically isolated by plastic material in order to satisfy the antenna requirements.

3.6.4.1 BRAKE PARACHUTE: A brake parachute shall be installed at the base of the vertical tail to provide additional or auxiliary braking power for use on ice-covered runways or when landing on short runways.

3.6.5 RUDDER: The rudder shall be of riveted metal torque box and rib construction with metal covering. Trim tabs are not required. Balancing of rudder is not required.

3. REQUIREMENTS (Cont)

3.7 BODY GROUP:

3.7.1 FUSELAGE:

3.7.1.1 **DESCRIPTION:** The fuselage shall be arranged as specified in Paragraph 3.2.1.

3.7.1.2 **CONSTRUCTION:** The fuselage shall be basically of riveted, high strength aluminum alloy construction with bulkheads and beltframes and stressed-skin metal covering. Corrosion and heat-resisting material shall be used where required in the engine section. Heat-resistant, transparent material shall be used for the transparent portion of the pilot's enclosure.

3.7.1.3 CREW AND PERSONNEL STATIONS:

3.7.1.3.1 ⑬ The pilot's compartment shall include provision for one ejection seat, flight controls, instruments and power plant and accessory controls and instruments. The center of the instrument panel shall accommodate the pilot's display component of the MX-1179 Electronics and Control System.

3.7.1.3.2 The pilot's compartment shall be designed to be pressurized as specified in Paragraph 3.20.1.1.1.

3.7.1.3.3 Provision shall be made for the pilot to enter and leave the airplane without the use of separate ladders or platforms.

3.7.1.3.4 The pilot's compartment shall be equipped with a hinged canopy, which shall be spring-balanced for manual operation, for normal entrance and exit and which shall be capable of being jettisoned by means of a canopy remover fired as a part of the seat ejection sequence for emergency exit in flight.

3.7.1.3.5 The maximum practicable hemispherical visibility shall be provided to either side of the forward line of sight, and to either side above and below the line of sight. The forward and downward visibility over the nose shall be 15° to the wing chord plane.

3. REQUIREMENTS (Cont)

3.7.1.3.6 The pilot's windshield shall be fabricated from temper glass.

3.7.1.3.7 The cockpit configuration shall be arranged to accommodate a USAF standard ejection seat, as defined by Republic Aviation Drawing No. 5066150 (modified.)

3.7.1.4 CARGO COMPARTMENTS: Not applicable.

3.7.1.5 EQUIPMENT COMPARTMENTS: Space and weight provisions shall be made to install MX-1179 Electronics and Control System equipment having a total volume of 42 cubic feet in and adjacent to the pilot's compartment. The detail distribution of this equipment shall be jointly determined with Hughes Aircraft Corporation. Readily removable access doors shall be provided for all components of the MX-1179 Electronic and Control System requiring adjustment and preflight checks.

3.7.1.6 SPEED BRAKES: Three speed brake panels shall be provided. These shall be located in the aft portion of the fuselage; one on the bottom and the other two between the wing and vertical stabilizer. They shall be hydraulically operated with no preselected positioning provisions. Locks shall be provided for the closed position only.

3.7.1.7 ROCKET AND MISSILE BAYS: Provisions to accommodate the armament, as specified in Paragraph 3.18.3, shall be incorporated in the lower portion of the fuselage forward of the main landing gear.

3.7.1.7.1 The rocket and missile bays shall accommodate the installation of the ferry fuel tanks referenced in Paragraph 3.12.9.1.

3.7.1.8 WHEEL WELLS: Provision shall be made to house the nose wheel and portions of the two main wheel landing gear units in the fuselage.

3.7.2 HULL: Not applicable.

3. REQUIREMENTS (Cont)

3.8 ALIGHTING GEAR:

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3.8.1 GENERAL DESCRIPTION AND COMPONENTS: The landing gear shall be of the retractable, tricycle type, consisting of a nose gear unit and two main gear units.

3.8.2 MAIN LANDING GEAR:

3.8.2.1 DESCRIPTION: The main landing gear consists of two units attached to the wing structure and retracting into wells in the wing and fuselage. Each unit includes a shock absorber strut and one wheel, tire, tube and brake.

3.8.2.2 WHEELS, BRAKES AND BRAKE CONTROL SYSTEMS: The main wheels shall be 32 x 8.8, Type VII and shall be equipped with pneumatic brakes. The brakes shall be actuated by means of toe controls which form an integral part of the pilot's rudder pedals. The brake system shall be in accordance with Specification No. AN-B-2, except as noted in Appendix II. Anti-skid devices are not required.

(87)
(88)

3.8.2.3 TIRES AND TUBES: The main wheel tires and tubes shall be 32 x 8.8, Type VII.

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3.8.2.4 SHOCK ABSORBERS: Each main landing gear unit shall include one shock absorber strut designed in accordance with Specification No. 40228J(4) and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

(158)
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(163)

3.8.2.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS: The main landing gear shall be hydraulically retracted and extended by means of a control located convenient to the pilot. Safety devices shall be provided to prevent inadvertent retraction of the main landing gear when the airplane is on the ground. Positive mechanical locks shall be provided in both the extended and retracted positions.

3.8.2.6 DOORS AND FAIRINGS: Hinged doors and fairings shall be provided to cover the main landing gear wells in the fuselage and wing.

3. REQUIREMENTS (Cont)

3.8.2.7 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the main landing gear units requiring inspection, maintenance and servicing including lubrication, and for removal and replacement of parts subject to wear in service.

3.8.3 AUXILIARY LANDING GEAR (Tail Wheel): Not Applicable.

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3.8.4 AUXILIARY LANDING GEAR (Nose Wheel):

3.8.4.1 DESCRIPTION: The nose landing gear consists of a single steerable unit attached to the fuselage structure and retracting into a well in the nose. This unit includes a shock absorber strut and one wheel, tire and tube.

3.8.4.2 WHEEL: The nose wheel shall be 24 x 5.5, Type VII.

3.8.4.3 TIRE AND TUBE: The nose wheel tire and tube shall be 24 x 5.5, Type VII EHP.

3.8.4.4 SHOCK ABSORBER: The nose landing gear unit shall be equipped with one shock absorber strut designed in accordance with Specification No. 40228J(4), and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

(153) thru (163)

3.8.4.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS: The nose landing gear unit shall be hydraulically retracted and extended by means of the control specified in Paragraph 3.8.2.5. Safety devices shall be provided to prevent inadvertent retraction of the nose landing gear when the airplane is on the ground. A positive mechanical lock shall be provided in both the extended and retracted positions.

3.8.4.6 DOORS AND FAIRINGS: Hinged door(s) and fairing shall be provided to enclose the nose wheel well in the nose of the fuselage.

3.8.4.7 STEERING CONTROL: Provision shall be made for hydraulically steering the nose wheel by means of the pilot's rudder pedals.

3. REQUIREMENTS (Cont)

3.8.4.8 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the nose landing gear unit requiring inspection, maintenance and servicing, including lubrication, and for removal and replacement of parts subject to wear in service.

3.9 ALIGHTING GEAR (Water Type): Not applicable.

3. REQUIREMENTS (Cont)

3.10 SURFACE CONTROL SYSTEM:

3.10.1 PRIMARY FLIGHT CONTROL SYSTEM: The primary flight control system shall be an irreversible, full-hydraulic power system, including artificial feel and trimming devices. The irreversible power actuators shall also serve as the automatic flight servos, and shall be designed to function in conjunction with the MX-1179 Electronic and Control System to provide satisfactory airplane performance during all automatic flight operations. A dual hydraulic power system shall be provided as described in Paragraph 3.15.1. The control system shall be in accordance with Handbook of Instructions for Aircraft Designers (HIAD), except as noted in Appendix II. PAGE 126 & 87

(31) ([illegible]) Page 87 & 126

3.10.1.1 FLIGHT STATION CONTROLS: The cockpit elements of the flight control system shall include the pilot's rudder pedals, control stick and trim controls.

(33) (34) Page 86

3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS:

3.10.2.1 LIFT AND DRAG INCREASING DEVICE SYSTEMS: Provisions for the release and jettison of the brake parachute shall be installed in the cockpit conveniently located for use by the pilot.

3.10.2.2 SPEED BRAKES: Provision shall be made to control the extension of the speed brakes by a switch located on the throttle control lever.

3.10.3 TRIM CONTROL SYSTEMS: The primary flight control system shall include trimming devices. The trimming devices shall operate in such a manner as to prevent objectionable control stick and surface motion when the automatic control system is disengaged.

(32) Page 87

3.10.4 AUTOMATIC FLIGHT CONTROL INSTALLATION: The functions of an automatic flight system shall be included in the MX-1179 Electronic and Control System equipment. This equipment shall be interconnected to, and shall serve to satisfactorily operate, the various airplane control systems required for automatically accomplishing the prescribed phases of the mission of the airplane. All control elements shall be so located as to simplify inspection, maintenance and servicing procedures.

SECRET
SECURITY INFORMATION

3. REQUIREMENTS (Cont)

3.10.4.1 The control system tie-in (CSTI) of the MX-1179 shall be installed to provide gyro stabilized straight line flight when the radar is not operated, using the radar gyroscopes. This mode of operation shall be accessible to the pilot through manually-controlled switches as a "pilot relief" system. An automatic pilot controller is not required.

3.11 ENGINE SECTION: The aft section of the fuselage shall be designed to accommodate the turbo-jet engine specified herein. A fire wall shall be provided and the engine shall be shrouded as necessary for cooling and fire protection purposes.

(52) (61)
(56)
(60) Supp 98, 99, 100 & 102

3.11.1 DESCRIPTION AND COMPONENTS: The engine section is located in the aft section of the fuselage and designed to accommodate the specified turbo-jet engine.

3.11.2 CONSTRUCTION: See Paragraph 3.7.1.2, Fuselage Construction.

3.11.3 ENGINE MOUNTS: Provision shall be made to mount the specified turbo-jet engine.

3.11.4 VIBRATION ISOLATORS: Vibration isolators are not required.

3.11.5 FIRE WALLS: For fire protection, a vertical fire wall shall be provided at the engine fire wall to divide the engine compartment into two compart-

(59)
(60) Supp 101 & 102

SECRET
SECURITY INFORMATION

3. REQUIREMENTS (Cont)

ments. That portion of the engine and afterburner aft of the fire wall may, at the Contractor's discretion, be blanketed for protection of adjacent structure from excessive temperatures.

3.11.6 COWLING AND COWL FLAPS: Not required.

3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE: Removable panels shall be provided as required for access to the engine installation for inspection and maintenance.

3.12 PROPULSION:

3.12.1 GENERAL DESCRIPTION AND COMPONENTS: The propulsion group includes the turbo-jet engine specified below, the required accessories, and related systems. Engine inlet screen will not be required.

3.12.2 MAIN PROPULSION UNIT:

3.12.2.1 The airplane shall be equipped with one modified Pratt and Whitney J57-P-7 turbo-jet engine in general accordance with Pratt and Whitney Specification No. A-1637, and rated at 15,000 pounds of thrust, static at sea level. The engine shall be in accordance with Pratt and Whitney Drawing No. 190601, Change A-2 dated 31 December 1951, except as follows:

(a) The afterburner shall be increased in length as specified by the Contractor.

3. REQUIREMENTS (Cont)

(b) Those components of the afterburner fuel system presently located below the engine shall be moved to the optional location shown on Pratt and Whitney Drawing No. LR-19758 dated 20 September 1951.

(c) The dimensions of the fire wall shall be as shown on sheet 2 of Pratt and Whitney Drawing No. SL-20416, dated 24 March 1952.

(d) Any future revisions shall be mutually acceptable to Pratt and Whitney and the Contractor.

3.12.3 AUXILIARY PROPULSION UNIT: Not required.

3.12.4 ENGINE-DRIVEN ACCESSORIES: Two hydraulic pumps and one tachometer generator shall be installed on and driven by the engine.

3.12.5 AIR INDUCTION SYSTEM: Air inlets, with boundary layer bleeds, shall be located on each side of the fuselage adjacent to the pilot's compartment with ducts extending aft to the engine. The air inlet duct lips shall be anti-iced as specified in Paragraph 3.20.2.1.

3.12.6 EXHAUST SYSTEM: The engine shall be furnished complete with exhaust system, including afterburner with variable area nozzle.

(59) 101

3.12.7 COOLING SYSTEM: Adequate cooling for the engine, engine accessories, aircraft equipment, components and structure shall be provided.

3.12.8 LUBRICATING SYSTEM:

(62) 103

3.12.8.1 DESCRIPTION AND COMPONENTS: The specified engine shall be furnished complete with lubricating system, including oil tank, oil-fuel heat exchanger (oil cooler), pumps, lines, strainer and valves. An additional air oil cooler shall be provided by the Contractor, if necessary, to maintain required oil temperature.

(55) (63) thru (68) 101-104

3.12.8.1.1 A suitable access door shall be provided for oil tank servicing.

3. REQUIREMENTS (Cont)

3.12.9 FUEL SYSTEM:

3.12.9.1 DESCRIPTION AND COMPONENTS: The fuel system shall include tanks, lines, pumps, valves and controls. The system shall be designed for the use of fuels conforming to Specification No. MIL-F-5624A, Grade JP-4. Complete provisions for the installation of a ferry fuel system kit shall be provided.

(69) 104
(70) 107
(74) 101

3.12.9.2 PUMPS: Four alternating current, electric motor-driven fuel booster pumps shall be provided in the wing fuel tanks. Other pumps shall be as furnished with the specified engine.

(73) 104

3.12.9.3 TANKS (Fixed): Fuel tanks of 1050 gallons total net capacity shall be provided as an integral part of the wing structure.

㊾ 96 ㊿ (57) 100

3.12.9.4 TANKS (Droppable): Droppable fuel tanks are not required.

3.12.9.5 VENT SYSTEM: The fuel tanks shall be vented in a manner consistent with fuel tank pressurization requirements. The vent system shall include the required lines, fittings, valves and equipment.

㊽ (71) 98 106 107
(54) (72)

3.12.9.6 PIPING AND FITTINGS: All piping and connections in the fuel system shall be in accordance with applicable specifications and installed in accordance with the requirements of the HIAD, except as specified in Appendix II.

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㊼ (53)

3.12.9.7 VALVES: Valves shall be provided as required and shall be in accordance with applicable specifications.

3.12.9.8 STRAINERS AND FILTERS: Fuel system strainer(s) shall be provided and shall be as approved by WADC.

(75) 109

3.12.9.9 QUANTITY GAGES AND FLOWMETERS: A single combined fuel flow instantaneous rate and total fuel remaining indicating system shall be provided. A fuel quantity gage system is not required. A fuel low-level warning light shall be provided.

(79) 111

3. REQUIREMENTS (Cont)

3.12.9.10 DRAINAGE PROVISIONS: Provision shall be made to drain fuel from the tanks.

(58) 101

3.12.9.11 FUEL VAPOR INERTION: Not required.

3.12.9.12 FUEL EVAPORATION CONTROL: Air shall be bled from the engine compressor section and shall be used to pressurize the fuel tanks to reduce fuel evaporation.

3.12.9.13 REFUELING PROVISIONS: Provision shall be made for pressure and emergency gravity refueling on the ground.

(55) 99

3.12.9.14 DEFUELING PROVISIONS: The fuel booster pumps shall be used for de-fueling on the ground.

3.12.10 WATER INJECTION SYSTEM: Not applicable.

3.12.11 PROPULSION SYSTEM CONTROLS: A power control lever shall be provided for the pilot and connected to the power lever furnished with the specified engine.

(36) 99

3.12.12 STARTING SYSTEM: The starting system shall include an air turbine starter requiring an external source of compressed air. The main engine starting controls shall be located for use by the pilot.

3.12.13 PROPELLER: Not applicable.

3.12.14 ROCKET PROPULSION SYSTEM: Not required.

3. REQUIREMENTS (Cont)

3.13 AUXILIARY POWER PLANT: The auxiliary power unit shall consist of a modified Continental F-3 gas turbine compressor (GTC), remotely located from the airplane, to provide compressed air. Provisions shall be made for stowing this unit within the airplane for its transportation. The unit shall not be operable when stowed within the airplane.

3.13.1 The following shall be provided on the airplane for use with the GTC:

(a) A receptacle to supply power from the airplane's battery to start the GTC.

(b) A connection to furnish gravity head fuel supply to the GTC.

(c) A fitting to connect the compressed air supply duct.

3. REQUIREMENTS (Cont)

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT:

3.14.1 INSTRUMENTS: The following instruments shall be located on the pilot's instrument panel:

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One combination air speed indicator and Machmeter
One altimeter
One attitude gyro
One rate-of-climb indicator
One turn and bank indicator
One course deviation indicator
One fuel low-level warning light
One accelerometer
One pilot's display (part of MX-1179)
One standby compass (on subpanel)
One clock
One cabin pressure altimeter (on subpanel)
One dual hydraulic pressure indicator
One fuel flow rate indicator and totalizer
One oil pressure indicator
One tachometer
One turbine outlet temperature indicator
One direct current loadmeter
One alternating current voltmeter with selector switch
One pneumatic pressure indicator
One liquid oxygen quantity indicator
Three landing gear position indicators
One compass bearing indicator

3.14.2 NAVIGATION EQUIPMENT: Included in MX-1179 Electronic and Control System equipment (See Section 3.17).

3.14.3 INSTALLATION: Instruments shall be installed in accordance with the HIAD and other applicable specifications, except as noted in Appendix II. The instrument arrangement shall be as approved by the Air Force.

(77) (133)
(131) (157)
(132) (167)

SECRET
SECURITY INFORMATION

3. REQUIREMENTS (Cont)

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS:

3.15.1 HYDRAULIC SYSTEM:

Flight tests are MIL-T-5522

3.15.1.1 DESCRIPTION AND COMPONENTS: The hydraulic systems shall be in accordance with Specification No. MIL-H-5440, except as noted in Appendix II. The hydraulic configuration shall consist of two separate continuously-operating, closed center systems. The systems shall be of equivalent capacity and each system powered by an engine-driven, 3000-psi, variable volume pump. One system will be considered as the primary system, to be used only for controls. The other system will be called the secondary system, to be used for controls plus utility items such and landing gear, speed brakes, and nose wheel steering. The primary and secondary systems are not interconnected, except mechanically, at the surface control valve and actuating cylinders. All utility items, when not in use, will be shut off from the secondary system. If the primary system is inoperative, the landing gear will be lowered by an emergency method, thus relieving possibility of failure to the secondary system at landing. To provide for failure of the power plant, which is the only source of continuous power, an emergency air-driven hydraulic pump will supply power to the primary system for use of the controls. Hydraulic pumps shall be approved by Wright Air Development Center.

(133) thru (145) (150)

3.15.1.2 SUMMARY OF ACTUATED ITEMS: The hydraulic system shall be used to actuate the following items:

Surface control system
Landing gear extension and retraction and doors
Speed brakes
Nose wheel steering

(37) (146) thru (149)

3.15.2 PNEUMATIC SYSTEMS:

3.15.2.1 LOW PRESSURE PNEUMATIC SYSTEM: A low pressure pneumatic system shall be provided to supply power for the air conditioning system, as described under Paragraph 3.20.

SECRET
SECURITY INFORMATION

3. REQUIREMENTS (Cont)

3.15.2.1.1 SUMMARY OF ACTUATED ITEMS: The low pressure pneumatic system shall be used to actuate the following items:

Cabin pressurization and air conditioning
Alternator, generator, air compressor drive
Fuel tank pressurization and purging
Wing and tail leading edge and air intake duct anti-icing
Pressurization and coolong of MX-1179 Electronic and Control System equipment
Canopy seal pressurization
Windshield de-fog
"G" suit or pressure suit
Ground cooling and heating of armament
Engine air starting system

3.15.2.2 HIGH PRESSURE PNEUMATIC SYSTEM: A high pressure pneumatic system shall be provided in accordance with Specification No. MIL-P-5518, except as noted in Appendix II.

3.15.2.2.1 DESCRIPTION AND COMPONENTS: The high pressure pneumatic system shall consist of an air flask that is charged by a 3000-psi air compressor, which is driven by the air turbine motor of the low pressure pneumatic system. High pressure air stored in the flask shall supply energy for the system's operation.

3.15.2.2.1.1 SUMMARY OF ACTUATED ITEMS: The high pressure pneumatic system shall be used to actuate the following items:

Emergency landing gear extension
Armament displacement gear
Main landing gear brakes
Armament bay doors

3. REQUIREMENTS (Cont)

3.16 ELECTRICAL:

3.16.1 DESCRIPTION: The electrical system shall consist of a 28-volt direct current system, a 200/115-volt, 400-cycle, three-phase system, and a power system consisting of a MX-1179 generator supplying voltages for operation of the unit. Provision shall be made for emergency operation of essential alternating current loads from the direct current bus.

3.16.2 ELECTRICAL POWER SUPPLY:

3.16.2.1 (107) thru (112) (173) DIRECT CURRENT: Direct current power shall be supplied by a 200-ampere, 30-volt generator. The generator shall be driven by the refrigeration turbine and shall be cooled by the airplane cooling system. The generator control system shall be substantially in accordance with USAF Exhibit MCREXE-22-89A. The system shall include an "essential" and a "nonessential" bus with provisions for automatically disconnecting the nonessential bus in the event of generator failure. a 24-volt, 36-ampere-hour battery, AN3150-2, shall be installed and connected to the essential direct current bus. A warning light shall be installed in the cockpit to indicate generator failure. Provision for voltage adjustment in flight is not required.

3.16.2.2 (107) (119) (173) ALTERNATING CURRENT: The alternating current power shall be supplied by a 15-KVA, 208/120-volt, three-phase alternator. The alternator shall be driven by the cooling air expansion turbine in the cabin air conditioning and pressurizing system. A dummy load shall be provided, if necessary, to place sufficient load on the turbine. The control system shall include a voltage regulator, Type L-3, and an alternator control panel in accordance with USAF Exhibit WCEEE-1-12. Cooling shall be provided by the airplane cooling system. Equipment shall be provided on the expansion turbine to control the frequency of the alternator output, as required.

3.16.2.3 SPECIAL POWER: The power system of the MX-1179 shall be installed to meet the requirements of the MX-1179 equipment. Also, means shall be provided to supply power from the MX-1179 system to the airplane's system in event of failure of the airplane's generators. Under this condition, the MX-1179 equipment need not be fully operable.

3. REQUIREMENTS (Cont)

3.16.3 ELECTRICAL POWER CONVERSION:

3.16.3.1 (115) INSTRUMENT POWER: Instrument power shall be supplied by a 200/115-volt, three-phase transformer. This power shall be used to operate the electrically-driven alternating current gyro instruments. A single-phase, 115/26-volt transformer shall be installed for operating the autosyn instruments. Normally, these transformers receive power from the airplane's alternating current bus. In event of failure of the alternator, power shall be supplied from the MX-1179 equipment power unit. An AN3499-1, 100-VA, three-phase, 115-volt inverter shall be installed as an inoperative spare for use in the event of engine, turbine, or 200/115-volt transformer failure.

3.16.3.2 (115) EMERGENCY INVERTER: A 500-VA, 115-volt, single-phase inverter, AN3513-2, shall be installed to supply alternating current power for essential communications, IFF and navigational equipment in the MX-1179 system, in the event of failure of the engine turbine or the MX-1179 power system.

3.16.4 (120) (163) (169) (170) (172) 135 169 171 EQUIPMENT INSTALLATION: Electrical equipment shall be installed in accordance with Specifications No. 32300E and MIL-E-7080, and USAF Exhibit TSEPE-6E-47, as applicable. The battery shall be so installed as to permit ease of replacement and shall be vented as required. Equipment shall be installed to operate in ambient temperatures within the limits of applicable specifications, except that higher temperatures during periods of time not to exceed five minutes will be permissible.

(134) 3.16.5 (136) (137) WIRING: Wiring shall be installed in accordance with Specification No. MIL-W-5088, except as specified in Appendix II.

3.16.6 BONDING: The airplane and equipment shall be bonded as required by Specification No. MIL-B-5087. Shielding shall conform to Specification No. MIL-W-5088.

3.16.7 (83) CONTROLS: Switches, circuit breakers, rheostats and resistors shall be provided as required and shall be in accordance with applicable specifications, or as otherwise approved by the WADC.

3. REQUIREMENTS (Cont)

3.16.8 LIGHTING:

3.16.8.1 GENERAL: Lighting shall be installed in accordance with Specification No. MIL-L-6503(USAF). All lighting fixtures and accessory equipment shall be in accordance with applicable specifications or as otherwise approved by the WADC.

3.16.8.2 (164) INTERIOR: Instrument lighting shall be of the Air-Force-Navy standard type and shall include individual instrument lights in accordance with Specification No. MIL-F-5057. A secondary red floodlighting system shall be provided. A Type C-4A spotlight shall be installed for cockpit floodlighting and map reading. Console panels shall be of the edge-lighted type in accordance with Specification No. AN-P-89. Thunder-storm lighting shall be provided.

3.16.8.2.1 Built-in trouble lights shall be provided in the missile bay areas to facilitate maintenance and loading operations. Similar lights shall also be provided to facilitate maintenance and adjustment of the MX-1179 Electronic and Control System equipment. The location of the lights shall be as approved by the Mock-Up Board.

3.16.8.3 (166) EXTERIOR: Exterior lighting shall be in accordance with Specification No. MIL-L-6730. A taxi light shall be provided on the nose landing gear. A landing light shall be installed on the left main landing gear strut and shall provide the required illumination. The wing tip lights shall be of such design as to be aerodynamically compatible with the wing.

3.16.9 IGNITION AND STARTING CONTROL SYSTEM: The ignition and starting control system shall be designed to the requirements of the manufacturer of the specified engine. Controls shall be located for ease of operation and shall be subject to WADC approval.

3.16.10 RECEPTACLES:

3.16.10.1 (116) (117) (118) EXTERNAL POWER: Both direct and alternating current external power receptacles shall be provided. The receptacles shall be located as approved by the Mock-Up Board, and shall be accessible from the ground.

3. REQUIREMENTS (Cont)

The direct current receptacle shall energize both the essential and non-essential buses. The direct current and alternating current receptacles shall conform to AN2552 and AN3114 respectively. External power shall not be provided for operation of the MX-1179 equipment. Power to drive the MX-1179 equipment on the ground shall be obtained from the Ground Air Conditioning system as specified in paragraph 3.20.1.2.1.

3.16.10.2 (135) ELECTRICAL CONNECTORS: Electrical connectors shall conform to Specification No. MIL-C-5015, except that where special connectors are required, they shall be subject to WADC approval.

3.16.10.3 FUEL NOZZLE GROUNDING JACK: A fuel nozzle grounding jack shall be provided adjacent to the fuel tank filler connection and shall be identified in accordance with Drawing No. AND10439.

3.16.10.4 STATIC GROUND: A static ground shall be provided on the landing gear in accordance with Figure 12 of Specification No. 32300E.

3.16.11 INDICATORS:

3.16.11.1 ALARMS: A Type J-2 audible warning signal, Specification No. 32462, shall be provided to warn the pilot that the landing gear is not down and locked when the throttle is retarded for landing.

3.16.11.2 (113) (114) SIGNAL ASSEMBLIES: Three landing gear signal assemblies, Specification No. MIL-I-6839, shall be provided on the instrument panel to indicate to the pilot the position of the landing gear units. A cabin altitude warning is not required.

3.16.11.3 (122) (115) WARNING LIGHTS: Warning lights shall be provided as necessary to warn the pilot of malfunction of essential equipment and other necessary functions. In addition, a warning light shall be provided on the instrument panel to warn the pilot of excessive airplane skin temperature to indicate that the airplane is approaching or has exceeded the critical speed. A landing gear warning light shall be provided in the landing gear control handle.

3. REQUIREMENTS (Cont)

3.16.11.4 (121) (122) METERS: A direct current loadmeter and an alternating current voltmeter shall be provided on the instrument panel but need not be located in close proximity to the generator and alternator controls. The alternating current voltmeter shall be provided with a selector switch to check various alternating current voltages.

3.16.12 ELECTRIC DRIVES: Electric motors shall be in general accordance with Specification No. AN-M-40. Specifications shall be prepared for all electro-mechanical actuators used in the airplane. These specifications shall include applicable environmental tests, test reports, design operating loads and design static loads. These specifications shall be submitted for WADC review.

3.16.13 (171) RELAYS: Relays shall be in accordance with applicable specifications and drawings, except that where special units are required they shall be subject to WADC approval. Relays shall be hermetically sealed where required due to danger of explosion or for operation at altitude.

3.16.14 BOOSTER COIL: Not applicable.

3.16.15 FILTERS: Filters shall be installed only where necessary to insure compliance with Specification No. MIL-I-6051. The type of filters used shall be as approved by WADC.

3. REQUIREMENTS (Cont)

3.17 ELECTRONICS: The electronics equipment installed in this airplane shall consist of the complete integrated electronic and control system as developed and manufactured by Hughes Aircraft Corporation under AF Project MX-1179. The following communications, navigation and IFF components which will be included as part of Project MX-1179 shall be installed. The standard AF components will be modified as necessary by Hughes Aircraft Corporation to meet the requirements of the MX-1179 installation in this airplane. The equipment will be bench, preflight, and flight tested in accordance with test specifications to be prepared by Hughes Aircraft Corporation, and approved by the Air Research and Development Command. All of the components for the above equipments, with the exception of the antennas, pilot's indicator, instruments, and controls, shall be so installed in the electronics compartments that they are readily accessible for ground maintenance and adjustment. The Hughes Aircraft Corporation will be responsible for designing the MX-1179 system so that no one component of the system produces radio noise or interference with other components of the system. The aircraft contractor is responsible for eliminating any interference with the MX-1179 system which might be caused by other auxiliary equipment in the aircraft. The Contractor shall test the completed aircraft in accordance with Specification No. MIL-I-6051. All electronic equipment wiring shall be installed in accordance with Specification No. MIL-W-5088, except as otherwise noted in Appendix II. Wiring diagrams shall be submitted to the Hughes Aircraft Corporation and Headquarters, ARDC for approval. The installation requirements for the radar equipment, computer, and missile auxiliaries, which are also a part of the MX-1179 system, are covered under Section 3.18. The Contractor shall provide adequate cooling for the MX-1179 system. The cooling requirements shall be obtained from the Hughes Aircraft Corporation.

3.17.1 LIST OF EQUIPMENT:

Radio set AN/ARC-34	UHF Command
UHF-D/F adapter AN/ARA-25	UHF Direction Finding
Omni-DME equipment AN/ARN-21	Tactical Omni-DME
Data link receiver and decoder	

3. REQUIREMENTS (Cont)

Radio receiving set AN/ARN-19	Omni-localizer
Radio receiving set AN/ARN-22	Glide path
Radar set AN/APN-71	Flare-out altimeter
Radar identification set AN/APX-19	IFF air-to-ground
Air-to-air IFF to include a transponder and interrogator-responser	
Intercommunication set AN/AIC-10	

Provisions shall be made in the MX-1179 system for the installation of a miniaturized AN/APN-34, DME equipment as alternate to the AN/ARN-21.

The radome shall be designed to meet the requirements of the Hughes Aircraft Corporation MX-1179 specification, which shall be submitted to the Contractor and WADC for approval. Development of this radome shall be a joint Contractor and Hughes responsibility.

3.17.1.1 (80) CONTROL CONSOLE: Control console shall be provided in accordance with HIAD, except as specified in Appendix II.

3.17.1.2 ANTENNAS: The antennas shall be designed and installed in accordance with applicable Military specifications, and Hughes Aircraft Corporation specification, which shall be submitted to the Contractor and WADC for approval.

3.17.2 COMMUNICATION EQUIPMENT:

3.17.2.1 COMMAND SET AN/ARC-34:

3.17.2.1.1 The controls for the UHF communication equipment shall be installed on the left hand side of the pilot's cockpit as close to the power control as practicable.

3. REQUIREMENTS (Cont)

3.17.2.1.2 The antenna system shall be designed by the Contractor and shall, as a minimum, meet the performance requirements of Specification No. MIL-A-6224(USAF), and the requirements of Paragraph 3.17.1.2. Multiple antennas shall be installed, if necessary, to satisfy the above requirements.

3.17.2.2 LIAISON SET: Not applicable.

3.17.2.3 INTERPHONE: The necessary components or circuits of Intercommunications Set AN/AIC-10 shall be installed to provide for the use of Microphone M-32/AIC (oxygen mask) and Headset H-75/AIC (helmet). Provisions shall be made for ground interphone communication between the cockpit and the electronic equipment compartment.

3.17.2.4 MICROPHONE AND HEADSETS: Provisions for a microphone and headset shall be made in accordance with Paragraph 3.17.2.3. A microphone switch, Specification No. 32549, shall be installed on the throttle control.

3.17.2.5 FILTER EQUIPMENT: Not applicable.

3.17.2.6 RECORDING EQUIPMENT: Not applicable.

3.17.3 NAVIGATION EQUIPMENT:

3.17.3.1 RADIO COMPASS: Not applicable.

3.17.3.2 MARKER BEACON EQUIPMENT: Not applicable.

3.17.3.3 INSTRUMENT APPROACH EQUIPMENT:

3.17.3.3.1 The localizer, omni-range and glide-path controls shall be installed on the right hand side of the cockpit.

3. REQUIREMENTS (Cont)

3.17.3.3.2 The glide-path antenna shall be designed by the Contractor and as a minimum, shall meet the performance requirements of Specification No. MIL-A-6325(USAF). The localizer VHF omni-range antenna shall be designed by the Contractor and as a minimum, shall meet the requirements of Specification No. MIL-A-6300(USAF). It shall be designed and/or installed to meet the requirements specified in Paragraph 3.17.1.2.

3.17.3.4 ALTIMETER-RADIO:

3.17.3.4.1 The antenna for the flare-out altimeter shall be located on the underside of the fuselage near the center of gravity of the aircraft. It shall be designed and/or installed to meet requirements specified in Paragraph 3.17.1.2.

3.17.3.5 RADIO RANGE RECEIVER: Not applicable.

3.17.3.6 HOMING ADAPTER:

3.17.3.6.1 The controls for the UHF D/F equipment shall be located adjacent to other navigation controls on the right hand side of the cockpit.

3.17.3.6.2 The antenna shall be designed and/or installed to meet the requirements specified in Paragraph 3.17.1.2.

3.17.3.7 VHF NAVIGATION RECEIVER: See Paragraph 3.17.3.3.

3.17.3.8 DISTANCE MEASURING EQUIPMENT:

3.17.3.8.1 The controls for the AN/ARN-21 and alternate miniaturized AN/APN-34 shall be installed adjacent to other navigation controls on the right hand side of the cockpit.

3.17.3.8.2 The antenna for the tactical omni-DME and AN/APX-19 equipment shall be designed and/or installed to requirements specified in Paragraph 3.17.1.2.

3.17.3.9 ARBITRARY COURSE COMPUTER: Not applicable.

3. REQUIREMENTS (Cont)

3.17.4 RADAR:

3.17.4.1 SEARCH EQUIPMENT: Not applicable.

3.17.4.2 LORAN EQUIPMENT: Not applicable.

3.17.4.3 AUTOMATIC GROUND POSITION INDICATING EQUIPMENT: Not applicable.

3.17.4.4 IDENTIFICATION EQUIPMENT:

3.17.4.4.1 The controls for the IFF transponders shall be installed on the right hand side of the cockpit accessible to the pilot.

3.17.4.4.2 The antenna for the air-to-ground IFF shall be designed and/or installed to meet the performance requirements of Specification No. MIL-A-6543, and the requirements of Paragraph 3.17.1.2. More than one antenna will be used if found necessary to satisfy the requirements of the AN/APN-34 and AN/APX-19 equipment which share this antenna system. (See Paragraph 3.17.3.8.2.)

3.17.4.4.3 The antenna for the X-band transponder for air-to-air identification shall be designed and installed to meet requirements specified in Paragraph 3.17.1.2. This antenna shall be developed by The Hughes Aircraft Corporation.

3.17.4.5 INTERROGATION EQUIPMENT:

3.17.4.5.1 The controls for the air-to-air interrogator responser shall be installed as specified by the Hughes Aircraft Corporation.

3.17.4.5.2 The interrogator-responser will use the radar antenna.

3.17.4.6 RADAR BEACON: Not applicable.

3.17.5 ELECTRONIC COUNTERMEASURE: Not applicable.

3. REQUIREMENTS (Cont)

3.17.6 ELECTRONIC GUIDANCE SYSTEM:

3.17.6.1 GUIDE LINKS AND SYSTEMS:

3.17.6.1.1 The antenna requirements for the data receiver are the same as those for the communications receiver (See Paragraph 3.17.2.1.2.)

3.17.6.2 TELEVISION AND TELEMETERING EQUIPMENT: Not applicable.

3.17.7 STATIC DISCHARGERS: Not applicable.

3.17.8 EMERGENCY RESCUE TRANSMITTER: Not applicable.

3.17.9 RADOME: A radome, in accordance with the requirements of Hughes Aircraft Corporation specification for the MX-1179 equipment, shall be provided in the nose of the fuselage to accommodate a radar antenna. The radome shall be de-iced as specified in Paragraph 3.20.2.1.

3. REQUIREMENTS (Cont)

3.18 ARMAMENT:

3.18.1 DESCRIPTION: The armament installation shall consist of the specified aircraft rockets and guided missiles and related equipment.

3.18.2 FIXED GUNS: Not required.

3.18.3 ROCKETS AND MISSILES:

3.18.3.1 DESCRIPTION: The armament installation shall consist of MX-904 missiles and a 2.75-inch rockets stored within the bays in the fuselage. The missile bays shall provide for alternate loading arrangements of all missiles or all rockets. The rockets and missiles shall be fired automatically by the MX-1179 Electronic and Control System.

3.18.3.2 ROCKET LAUNCHER: The rocket launchers shall be an integral part of the missile bay doors which shall close flush with the fuselage contour when the launcher is in the retracted position. Means shall be provided for placing the rockets in firing position and for retracting the launcher to the closed position. A rocket firing contact shall be provided as a part of the rocket launcher to permit rocket firing when the launcher is in the extended position only.

3.18.3.3 MISSILE LAUNCHER: Means shall be provided for carrying six missiles within the fuselage. An actuator shall be provided to extend the missile prior to launching and for retracting the launcher after launching. The missile bay doors shall be provided with a locking arrangement to lock the doors in the closed position. Means shall be provided to hold the doors open on the ground. With the doors open, it shall be possible to load the missiles onto the launchers. The missile dispenser shall be retractable with the missile in place for ease in loading. Provision shall be made to automatically disconnect, when the missile is fired, the umbilical cord provided as a part of each missile to supply electronic power and signals from the MX-1179 Electronic and Control System for the missile electronic equipment.

3. REQUIREMENTS (Cont)

3.18.3.4 ALIGNMENT: The missiles shall be so aligned that, in the firing position, their axes will be fixed approximately two degrees down at the front with respect to the chord plane. The rockets shall be aligned approximately parallel to the chord plane in the firing position.

3.18.3.5 ARMAMENT CONTROLS:

3.18.3.5.1 The complete firing system shall be a part of the MX-1179 Electronic and Control System, except for the rocket firing intervalometer.

3.18.3.5.1.1 A manually-operated switch shall be provided for opening and closing the armament doors on the ground. Necessary switches of the momentary "On" type shall be provided in the missile bay area to reverse the missile dispenser for loading.

3.18.3.5.2 The MX-1179 Electronic and Control System shall include provision for checking the continuity of the rocket and missile firing circuits on the ground before armament installation.

3.18.4 FLEXIBLE GUNS: Provisions for flexible guns are not required.

3.18.5 STORES: Provisions for stores are not required.

3.18.6 PASSIVE DEFENSE:

3.18.6.1 WINDSHIELD ARMOR GLASS: Flat armor glass shall not be less than one-inch thick, and curved armor glass shall be not less than three-fourth inch thick. All armor shall be an integral part of the windshield. The glass shall be in accordance with Specification No. 12031, except for whatever modification may be necessary to incorporate electrical anti-icing provisions.

3.18.6.2 ARMOR PLATE: Not required.
(81)

3.18.6.3 CONE OF FIRE PROTECTION: Cone of fire protection for the pilot will be that area afforded by the armor glass and mass of electronic equipment located in front of the pilot.
(81)

3. REQUIREMENTS (Cont)

3.19 FURNISHINGS AND EQUIPMENT:

3.19.1 ACCOMMODATIONS FOR PERSONNEL:

3.19.1.1 (82) A Republic ejection seat shall be installed for the pilot. The seat shall include provision for attachment and use of a Type B-18 lap-type safety belt and a Type G-3 shoulder harness. The seat shall accommodate the pilot wearing the emergency rescue equipment specified in Paragraph 3.19.6.

3.19.1.2 A Type M-4 pressure regulating valve for an anti-g suit shall be installed in accordance with Specification No. 41095(2).

3.19.2 MISCELLANEOUS EQUIPMENT:

3.19.2.1 A relief tube shall be provided under the seat for use by the pilot, except that the tube from the cockpit floor to the horn, the horn and horn mounting shall be installed only for ferry flight.

3.19.2.2 An instrument panel shall be provided forward of the pilot for the flight and engine instruments specified in Paragraph 3.14.1. The instrument panel shall be in accordance with Specification No. AN-I-2a(2).

3.19.2.3 A flight report holder shall be provided in accordance with the HIAD.

3.19.2.4 A combination map and data case shall be provided. (84)

3.19.2.5 (123) An airplane check list holder shall be provided. The check list shall conform to Specification No. 40149.

3.19.2.6 Windshield wipers shall be installed.

3.19.2.7 Provisions for food and drinking water are not required.

3.19.2.8 Provisions for pyrotechnics are not required.

3. REQUIREMENTS (Cont)

3.19.3 FURNISHINGS:

3.19.3.1 Thermal and acoustical insulating materials shall be provided in accordance with Specification No. MIL-S-6144.

3.19.4 EMERGENCY EQUIPMENT: Fire detection and overheat warnings shall be provided for the engine accessory and burner compartments with indicators on the pilot's instrument panel. Fixed fire extinguishers are not required. Portable and hand-type extinguishers are not required.

3.19.5 OXYGEN EQUIPMENT: A low-pressure oxygen system, using a Type D-1 oxygen regulator and a liquid oxygen supply, shall be provided in general accordance with Specification No. MIL-I-5585A.

3.19.6 EMERGENCY RESCUE EQUIPMENT: The emergency rescue equipment for the pilot shall consist of a seat-type survival kit and back-type parachute. First aid kit, knife, emergency sustenance kit and anti-exposure suit are not required.

3. REQUIREMENTS (Cont)

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT:

3.20.1 ㊴ thru ㊹ AIR CONDITIONING: Cabin pressurization and air conditioning is obtained from engine compressor bleed air cooled in two stages. In the first stage this air is cooled with a ram air fed heat exchanger. Subsequent expansion of this air through an air turbine motor provides the second stage of cooling. The heat exchanger is employed to control the final air temperature, and the power extracted in the turbine expansion process is utilized to generate alternating and direct current electrical power and drive the pneumatic system air compressor. The electrical power produced supplies the needs of the MX-1179 and the basic airframe electrical requirements. Frequency regulation required is obtained by speed regulation of the air turbine motor. The shaft loading on the expansion turbine is always sufficient to insure adequate flow and pressurization for the cockpit. In emergencies, ram air shall be ducted into the cockpit for air conditioning. The Contractor shall provide adequate cooling for all parts of the airplane such that the function and/or service life of no item on the airplane shall be appreciably impaired due to overheating. High temperature limits given in the applicable specifications of equipment and material items may be exceeded for a maximum duration of five minutes during flight.

3.20.1.1 IN-FLIGHT AIR CONDITIONING:

3.20.1.1.1 OCCUPIED COMPARTMENTS: Air for pressurizing, heating, cooling and ventilating the cabin shall be as specified in Paragraph 3.20.1. The maximum operating pressure differential shall not exceed 5 psi. An Altitude versus Pressure schedule is shown on Figure 4, page 53.

3.20.1.1.2 OTHER COMPARTMENTS:

3.20.1.1.2.1 ROCKET AND MISSILE BAY: Provision shall be made for cooling and heating the rocket and missile bay areas to maintain the rocket and missile temperature between 0° and 130°F.

3. REQUIREMENTS (Cont)

3.20.1.1.2.2 ELECTRONIC EQUIPMENT BAYS: Cooling air shall be supplied to the electronic equipment bays. Cooling air required shall be as necessary to insure satisfactory operation of the equipment.

3.20.1.1.2.3 MISCELLANEOUS COMPARTMENTS: Cooling air shall be provided by means of ram air or cockpit discharge air for the following compartments: Nose wheel well, main landing gear well, engine accessories compartment, engine tail section compartment, and the compartment containing the electrical power supply and refrigeration equipment.

3.20.1.2 GROUND AIR CONDITIONING:

㉒ ㉕

3.20.1.2.1 OCCUPIED COMPARTMENTS: On the ground, with the canopy closed, the pilot's compartment shall be conditioned by means of air bled from the compressor section when the engine is in operation. When the engine is not in operation, the conditioned air shall be provided by the auxiliary power plant described in Paragraph 3.13.

3.20.1.2.2 OTHER COMPARTMENTS:

3.20.1.2.2.1 ROCKET AND MISSILE BAY: The missile and rocket temperatures shall be maintained between 0° and 130°F on the ground using the same air sources specified in Paragraph 3.20.1.2.1.

3.20.1.2.2.2 ELECTRONIC EQUIPMENT BAYS: On the ground the electronic equipment bays shall be cooled as necessary to insure satisfactory operation of the equipment using the same air source as specified in Paragraph 3.20.1.2.1.

3.20.2 ANTI-ICING:

3.20.2.1 (124) thru (130) ANTI-ICING OF NONTRANSPARENT AREAS: The wing and tail leading edges and engine air intake duct lips shall be anti-iced by means of engine bleed air. The specified engine includes built-in anti-icing protection. The radome shall be de-iced by freezing point suppressant liquid spray system. Anti-icing shall be in accordance with Specification No. 40395-C, except as noted in Appendix II.

SECRET
Security Information

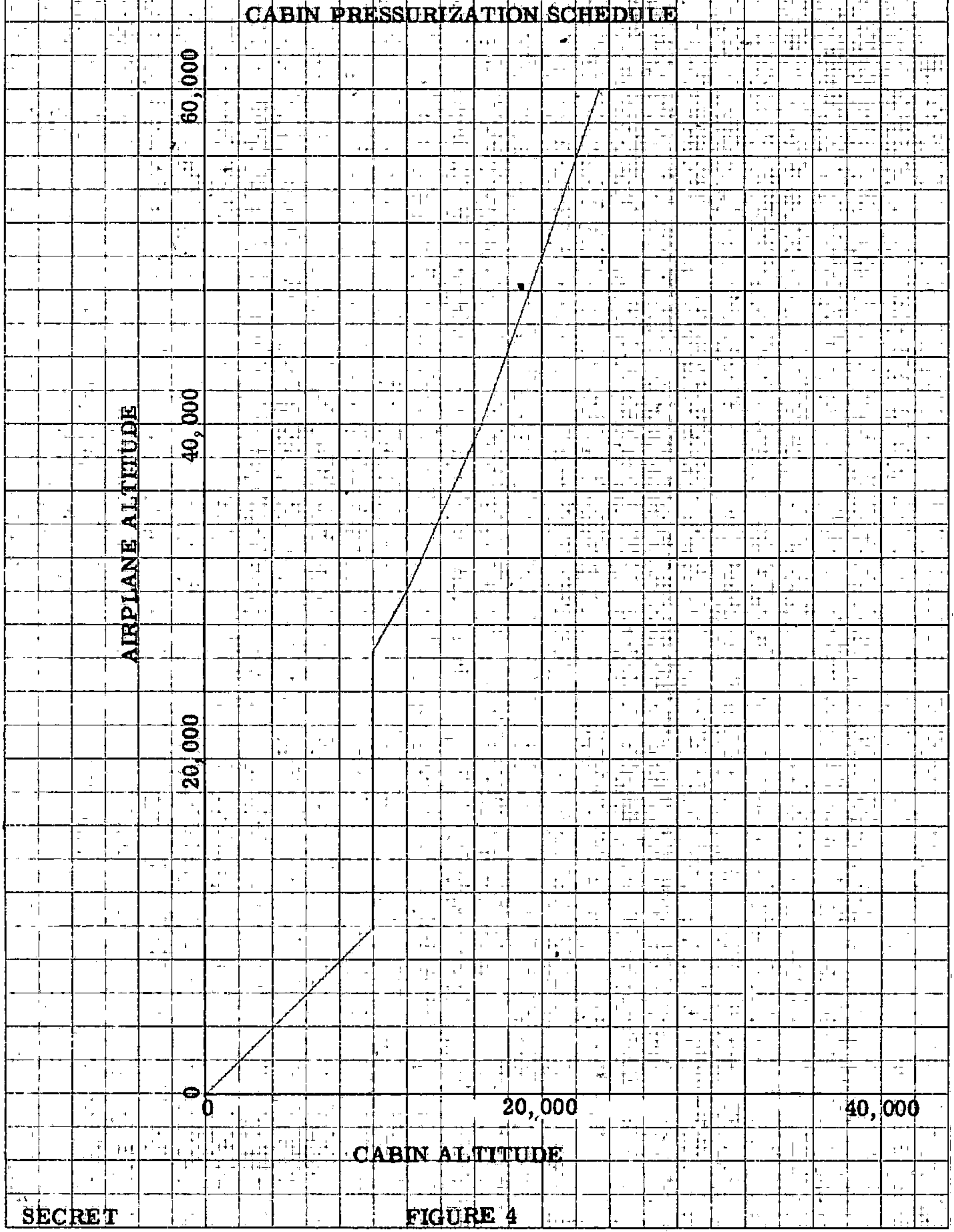

FIGURE 4

3. REQUIREMENTS (Cont)

3.20.2.2 (151) (152) ANTI-ICING, DEFROSTING AND DEFOGGING OF TRANSPARENT AREAS: Those portions of the windshield through which visibility is required for landing and use of the optical sight shall be anti-iced. All inner surfaces of transparent areas of the cockpit enclosure shall be defrosted and defogged. These provisions shall be in accordance with Specification No. MIL-T-5842, except as noted in Appendix II.

3.21 PHOTOGRAPHIC: Not required.

3. REQUIREMENT (Cont)

3.22 AUXILIARY GEAR: Auxiliary gear shall include provisions for towing, jacking, mooring, hoisting and leveling.

3.22.1 TOWING PROVISIONS:

3.22.1.1 MAIN LANDING GEAR: Tow lugs, or equivalent, with an inside diameter of not less than 2 inches shall be provided to permit attachment of a tow bar or cable for towing the airplane forward or backward.

3.22.1.2 NOSE LANDING GEAR: A hollow nose wheel axle with an inside diameter of 3/4 inch shall be provided to permit attachment of a tow bar for towing the airplane forward or pushing backward. An alternate arrangement in which an inside diameter of 3/4 inch extending one inch inboard from each outer face of the axle will be acceptable.

3.22.2 ㊴ JACKING PROVISIONS: Provision shall be made to jack the airplane as required by the HIAD. The provisions shall be in accordance with Specification No. AN-J-5(2), except as specified in Appendix II.

3.22.3 ㉘ MOORING PROVISIONS: Provision shall be made to moor the airplane in accordance with the requirements of the HIAD, except as specified in Appendix II.

3.22.4 ㉔ HOISTING PROVISIONS: Provisions shall be made for hoisting the airplane and components in accordance with the requirements of Specification No. MIL-S-5594.

3.22.5 LEVELING: Leveling provisions shall be in accordance with Specification No. MIL-M-6756, and will consist of two plumb bob positions on the bottom of the fuselage; one located forward of the nose wheel well and the other aft of the main wheel well. Two sets of leveling lugs shall be provided in the nose wheel well for leveling the airplane both laterally and longitudinally.

3.22.6 COVERS AND SHIELDS: Covers and/or shields for air scoop and exhaust openings, transparent glass and enclosures, wing, tail, and miscellaneous openings, conforming to Specifications No. MIL-C-5778,

3. REQUIREMENTS (Cont)

MIL-C-5462 and MIL-S-6451, as applicable, shall be furnished as specified in the aircraft procurement contract.

3.22.7 SPECIAL TOOLS: Special tools conforming to specification No. MIL-D-6861, dated 1 August 1950, shall be furnished as specified in the aircraft procurement contract.

4. SAMPLING, INSPECTION AND TEST PROCEDURES:

4.1 The method of inspection and tests shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

5. PREPARATION FOR DELIVERY:

5.1 Preparation for delivery shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

6. NOTES:

6.1 EXPLANATORY INFORMATION: See applicable data, Appendix III.

6.2 ADDITIONAL INFORMATION: See applicable data, Appendix III.

6.3 DEFINITIONS: Where the phrases "complete provision for", "structural provision for" and "space provision for" are used, the intent is defined as follows:

6.3.1 COMPLETE PROVISION FOR: "Complete provision for" a specific item of equipment, or assembly or installation, shall mean that all supports, brackets, tubes and fittings, electrical wiring, hydraulic lines, etc., are to be installed and adequate weight and space allocated so that the equipment can be installed without alteration to the specified equipment or the airplane, and that no additional parts are required for installation, other than the item itself. Standard stock items such as nuts, bolts, cotter pins, etc., need not be furnished.

6.3.2 STRUCTURAL PROVISIONS FOR: "Structural provisions for" a specific installation shall mean that the primary structure will be structurally adequate for the installation, but that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be required. Structural provisions also include weight of the equipment involved as an element of alternate weight.

6.3.3 SPACE PROVISIONS FOR: "Space provision for" a specific installation shall mean that space only shall be allocated for the installation, and that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be required. "Space provision for" does not imply that adequate attaching structure is provided, unless otherwise stated in each instance.

6.3.4 OTHER DEFINITIONS: Definitions of the HIAD, NACA Technical Report No. 474, and Specification No. MIL-I-6252(USAF) are considered applicable to the airplane described herein.

SECRET
SECURITY INFORMATION

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT--CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		LANDING GEAR (Weight Empty)		
1	1	Casing; Nose Gear	24 x 5.5, Type VII EHP (12 PRN)	
2	1	Tube; Nose Gear	24 x 5.5, Type VII EHP, fabric base	
3	1	Wheel Assembly; Nose Gear		
4	2	Casings; Main Gear	32 x 8.8, Type VII EHP (14 PRN)	
5	2	Tubes; Main Gear	32 x 8.8, Type VII EHP, fabric base	
6	2	Wheel Assemblies, Main Gear		
7	2	Brake Assemblies, Main Gear		
		POWER PLANT (Weight Empty)		
1	1	Engine; Turbo-jet, Including afterburner (weight for afterburner extension not included), P&W (dry)	J57-P-7 (Mod)	
2	1	Starter, Low Pressure Air - Hamilton-Standard Type M-3		
		POWER PLANT (Special Load)		
1	1	Gas Turbine Compressor (Continental)	F-3 (Mod)	

SECRET
SECURITY INFORMATION

SECRET
SECURITY INFORMATION

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		INSTRUMENTS (Weight Empty)		
1	1	Indicator; Hydraulic Pressure (dual), 0-5000 psi	Pioneer 24200	
2	2	Transmitters; Hydraulic Pressure	Pioneer 22300	
3	1	Indicator; Oil Pressure, 0-100 psi	MIL-I-7086	
4	1	Transmitter; Oil Pressure, 0 100 psi	MIL-T-5796	
5	1	Indicator; Tachometer, 2" dia	Spec 21302	
6	1	Generator; Tachometer	AN5544-3	
7	1	Indicator; Turbine Outlet Temperature	MIL-I-7076	
8	1	Compass; Standby	AN5766-T3	
9	1	Clock, 1-7/8" Dial	AN5743-1A	
10	1	Altimeter; Aircraft, 0 - 80,000 feet	AN5760-T5	
11	1	Altimeter; Cabin Pressure, 0-50,000 feet	MIL-I-5099	
12	1	Accelerometer; B-6	MIL-A-5885	
13	1	Indicator; Combination Air Speed and Machmeter	Special Design	
14	1	Indicator; Attitude Gyro, Type J-8	MIL-I-5133A	
15	1	Indicator; Bank and Turn (MIL-I-7805)	MS-28024-1	
16	1	Indicator; Rate of Climb, ±6000 ft/min	AN5825-T6	
17	1	Transmitter; Pneumatic Pressure	MIL-T-5483, Type V	
18	1	Indicator; Pneumatic Pressure, 1-1/2" dia	Navy B/A XAE-43, Type 1	
19	3	Indicators; Landing Gear Position	AN5839-1	
20	1	Voltmeter; Alternating Current, 0-150V.	AN3202-1	
21	1	Loadmeter; Direct Current, -.1 to +1.25.	MIL-A-5125	
22	4	Gages; Hydraulic Pressure, 0-5000 psi	AN5771-T7A	
23	1	Tube; Pitot Static	Special Design	
24	1	Remote Compass, Type J-2, Consisting of:		
	1	Control; Directional, Electric-driven Gyro, Type S-3A	MIL-C-6231A	
	1	Amplifier; Single Channel Integral, Slaved Gyro Magnetic Compass, Type A-2	21125A	

SECRET
SECURITY INFORMATION

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		INSTRUMENTS (Weight Empty)(Cont)		
24(Cont)		Remote Compass (Cont)		
	1	Transmitter; Remote Compass Unstabilized, Type C-2	27635	
	1	Compensator; Transmitter, Slaved Gyro Compass	27635	
		ELECTRICAL (Weight Empty)		
1	1	Generator; 30-volt, Direct Current	Special Design	
2	1	Panel; Generator Control, Direct Current	Special Design	
3	1	Battery; Storage, Shielded, 24-volt, 36-amp-hr	AN3150-2	
4	1	Alternator; 208/120-volt, 3-phase	Special Design	
5	1	Regulator; Alternator Voltage	Special Design	
6	1	Panel; Alternator Control	Special Design	
7	1	Inverter; Instrument, Class A, 100 VA, 3-Phase	AN3499-1	
8	1	Inverter, Class A, 500 VA, Single Phase	AN3513-1	
		ELECTRONICS (Weight Empty)		
1	1	Set Electronic and Control Syste, MX-1179	Hughes	

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		FURNISHINGS And EQUIPMENT (Weight Empty)		
1	1	Belt; Lap Safety, Type B-18	51H3977-1	
2	1	Harness; Shoulder, Type G-3	50D3772	
3	1	Valve; Regulating, Anti-g Suit, Type M-4.	AN6538-1	
4	1	Holder; Card, Compass Correction	AN5800-1	
5	1	Card; Compass Correction	AN5803	
6	1	Holder; Card, Air Speed Correction	Special Design	
7	1	Card; Air Speed Correction	Special Design	
8	1	Canopy Remover;	M1A2	
9	1	Personnel Ejection Catapult	T4E4	
10	1	Personnel Ejection Cartridge	M28A1	
11	1	Brake Parachute		
12	1	Personnel Catapult Initiator	T4	
13	1	Canopy Remover Cartridge	M29A2	
14	1	Canopy Remover Initiator	T4	
		FURNISHINGS and EQUIPMENT (Useful Load)		
1	1	Personnel Parachute; Back-type		
2	1	Survival Kit; Seat-Type		
		FIRE DETECTION (Weight Empty)		
1	1	Panel; Relay		
2	AR	Thermocouples		

SECRET
SECURITY INFORMATION

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		OXYGEN EQUIPMENT (Weight Empty)		
1	1	Regulator; Oxygen, Type D-1		
2	1	Converter; Liquid Oxygen, 5-Liter		
3	1	Tube; Oxygen Mask to Regulator	AN6003-2A	
4	1	Gage; Liquid Oxygen Quantity		
5	1	Valve; Liquid Oxygen Build-up and Vent..		
6	1	Valve; Liquid Oxygen Filler		

SECRET
SECURITY INFORMATION

SECRET
SECURITY INFORMATION

APPENDIX I-B

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - GOVERNMENT INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		ARMAMENT (Design Useful Load)		
1	24	Rockets; Aircraft, Folding-Fin, 2.75"	FFAR	
2	6	Missiles; Air-to-Air (Including launchers) ..	Hughes MX-904	
3	1	Destructor (R-7)(Navy 344428)	AN-M3( )	

SECRET
SECURITY INFORMATION

SECRET
SECURITY INFORMATION

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		LANDING GEAR (Weight Empty)		
1	1	Shock Strut - Nose Landing Gear		
2	2	Shock Struts - Main Landing Gear		
		POWER PLANT (Weight Empty)		
1	4	Pumps; Fuel Booster, Electric Motor-Driven		
2	1	Air Oil Cooler		

SECRET
SECURITY INFORMATION

SECRET
SECURITY INFORMATION

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

PNEUMATIC (High Pressure) and HYDRAULIC SYSTEM (Weight Empty)

Item No.	Qty	Description	Identification	Total Wt (Lb)
1	2	Pumps; Hydraulic, Engine-Driven Variable Volume		
2	1	Pump; Hydraulic, Air-Driven		
3	2	Accumulators; 3000-psi Hydraulic		
4	3	Valves; Surface Control		
5	2	Valves; Power Brake		
6	2	Valves; Landing Gear		
7	1	Valve; Speed Brake		
8	4	Valves; Armament Actuation		
9	7	Valves; Relief		
10	3	Valves; Relief (Air)		
11	AR	Valves; Check and Restrictor		
12	1	Valve; Emergency Landing Gear		
13	1	Valve; Nose Gear Steering		
14	4	Cylinders; Elevon Actuating		
15	1	Cylinder; Rudder Actuating		
16	3	Cylinders; Speed Brake Actuating		
17	2	Cylinders; Main Landing Gear		
18	1	Cylinder; Nose Landing Gear		
19	8	Cylinders; Armament Displacement Mechanism Actuating		
20	1	Cylinder; Canopy Unlatching		
21	2	Filters		
22	2	Switches; Pressure		
23	8	Quick Disconnects		
24	2	Coolers; Oil (hydraulic)		
25	1	Compressor; 3000-psi Air		
26	1	Flask; Air (3000 psi)		
27	1	Regulator; Pressure (Air)		

SECRET
SECURITY INFORMATION

SECRET
SECURITY INFORMATION

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		PNEUMATIC (Low Pressure), AIR CONDITIONING and ANTI-ICING SYSTEMS (Weight Empty)		
1	1	Air Turbine Motor, Gear Box and Heat Exchanger (refrigeration and accessory drive unit)		
2	1	Humidifier		
3	1	Valve; Temperature Control		
4	1	Valve; Ground Cooling (heat exchanger exhaust)		
5	1	Valve; ATM Shut-Off		
6	1	Valve; Armament and Electric Cooling		
7	1	Valve; Defog Selector		
8	1	Valve; Cabin Dump		
9	1	Valve; Cabin By-pass (ground test)		
10	1	Valve; Cabin Auxiliary Heat		
11	1	Valve; Cabin Canopy Check and Restrictor.		
12	3	Valves; Check		
13	2	Valves; Canopy Seal Selector		
14	2	Valves; Shut-Off		
15	2	Valves; Pressure Differential Control		
16	1	Regulator; Absolute Pressure		
17	1	Regulator; Cabin Pressure		
18	1	Fitting; Canopy Test		
19	1	Glycol Tank; Valve and Lines		
		INSTRUMENTS (Weight Empty)		
1	1	System; Fuel Mass Flowmeter (General Electric Type)	Special Design	

SECRET
SECURITY INFORMATION

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		ELECTRICAL (Weight Empty)		
1	1	Transformer; 208/115-Volt, 3-Phase .		
2	1	Transformer; 115/26-volt, 1-Phase		
3	1	Receptacle; External Power, 28-Volt, Direct Current with Shield..............	AN2552-3A	
4	1	Receptacle; External Power, 115/200 Volt, Alternating Current, 3-Phase	AN3114-2A	
5	1	Signal; Warning, Type J-2	32462	
6	1	Flasher; Position Light, Type C-2	32660	
7	2	Light Assemblies; Tail Position, White ...	AN3158-1	
8	2	Light Assemblies; Tail Position, Yellow ..	AN3158-2	
9	2	Light Assemblies; Top and Bottom Fuselage (two lamp) without Lamps		
10	2	Lamps; Incandescent, Single-Contact, Bayonet Candelabra, G-6 Bulb, 28-Volt, 6-cp (for top and bottom fuselage lights)..	AN3131-303	
11	1	Taxi Light; 150 Watts		
12	AR	Fixtures; Light, for Individual Instruments	MIL-F-5057	
13	AR	Lamp Assemblies; Cockpit, Fixed Red ...		
14	1	Light; Cockpit, Type C-4A	MIL-L-6484	
15	AR	Switches	MIL-S-6745	
16	AR	Circuit Breakers; MS25003, MS25004, MS25005, MS25006	MIL-C-5809	
17	AR	Light Assemblies; Press-to-Test Indicator, AN3157.........................	AN-L-34	
18	2	Light Assemblies; Wing Tip..............	(Special Design)	
19	1	System; Cabin Temperature Control......		
20	1	System; NESA Control		
21	1	System; Auxiliary Temperature Control ...		
22	AR	Lights; Thunder Storm		
23	1	Light Assembly; Landing		
24	1	Intervalometer; Rocket Firing		

SECRET
SECURITY INFORMATION

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification	Total Wt (Lb)
		ELECTRONIC (Weight Empty)		
1	1	Radome		
		FURNISHINGS and EQUIPMENT		
1	1	Ejection Seat Assembly (Republic Aviation)	Dwg 5066150(mod)	
2	1	Ejection Seat Tracks		

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1, Handbook of Instruction for Aircraft Designers, Ninth Edition, Including Revisions up to and including 1 April 1950.
1	3.1.6	Dimensions and General Data

Requirement: Paragraph 0.17 - Dimensions (maximum of aircraft parts) "For aircraft whose ferry range is less than 3,000 miles, the design shall be such that the aircraft may be readily disassembled and packed for shipment by rail and ocean borne carrier. Since there are limitations in the size of container which can be transported by surface carrier, all components should be designed to fall within those limitations. The importance of providing suitable fastenings, bearing surfaces, etc., for use in shipment of components and spare parts should be recognized in their design. Whenever it is possible, without unduly compromising design, the disassembled parts of the aircraft shall be of suitable dimensions for packaging in containers of minimum excess cubage."

Deviation: Consideration need not be given in the design for disassembly of the airplane for shipment nor for limitation of dimensions expressly for this purpose.

Reason for Change and Remarks: This airplane has a ferry range closely approaching the required 3,000 miles which the Contractor considers ample for ferrying anywhere using existing facilities.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
2	3.4	Structural Design Criteria
	Requirement:	Paragraph 3.1 - "The stress analysis criteria shall be as set forth in Specification No. C-1803. This document is classified Confidential".
	Deviation:	The structural criteria shall be as indicated in Contractor's report ZU-8-003, "F-102 Stress Analysis Criteria", in lieu of AF Spec C-1803-3 and R 1803-1 through R-1803-10. The Contractor's report shall be subject to approval of WADC.
	Reason for Change and Remarks:	To provide a specification specifically applicable to the configuration, speed, range, and purpose of the aircraft.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
3	3.2.2	Materials
	Requirement:	Paragraph 3.26, Castings - "For the purpose of structural analysis, castings are divided into two classes as follows:
		3.260 Class A Castings - Class A structural castings are those which show a margin of safety less than 900%, based on the allowable stresses taken from Chapters 4 to 6 inclusive of ANC-5. The footnotes of these tables calling for reduction of ultimate stress should be disregarded in these computations. These castings shall be inspected in accordance with AAF Specification No. 11357.
		3.261 Class B Castings - Class B structural castings are

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
3	3.2.2	Materials (Cont)

those which show a margin of safety in excess of 900%. They, together with nonstructural castings, shall be inspected in accordance with AAF Specification No. 11357."

Deviation:	Castings are divided into three classes as follows:
Class A	A Class A casting is defined as one, the single failure of which during any operating condition would cause loss of the aircraft or one of its major components, loss of control, unintentional release of or inability to release any armament store, failure of gun installation components, or which may cause significant injury to operating or nonoperating personnel.
Class B	A Class B casting is defined as one not included in Class A, and for which the minimum margin of safety for any design loading condition is 2.0 or less. The Contractor, at his option, may elect to include such castings in Class A, in which case the pertinent requirements for Class A castings shall be complied with.
Class C	A Class C casting is one not included in either Class A or Class B. The Contractor, at his option, may elect to include such castings in Class A or Class B, in which case the pertinent requirements for Class A or Class B castings, as applicable, shall be complied with.

Castings shall be inspected in accordance with Specification No. MIL-C-6021(Aer). All Class A castings shall have a type test. In general, only one casting as a type is to be tested. Where left and right hand castings are called out, a test of one will suffice. Where a casting is machined into two or more different final shapes, only the highest

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
3	3.2.2	Materials (Cont)

stressed version shall be static tested.

Reason for Change and Remarks: To establish classifications of castings in accordance with Specification No. MIL-C-6021(Aer) upon which Contractor's casting production control procedure is established.

* * * *

4 3.4 Structural Design Criteria

Requirement: Paragraph 4.102 - "Detailed measures required by the Air Materiel Command for avoiding flutter together with the data to be submitted, are listed in Specification No. 1817. It will generally be found advantageous to construct the prototype aircraft using a conservative approach to flutter prevention such as complete compliance with the detail requirements of the specification."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554, Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

5 3.4 Structural Design Criteria

Requirement: Paragraph 4.112 - "The requirements for the pre-

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
5	3.4	Structural Design Criteria (Cont)

vention of control surface lift reversal are contained in Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
6	3.4	Structural Design Criteria

Requirement: Paragraph 4.122 - "Requirements for the desired margin of safety against airfoil divergence are contained in Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
7	3.4	Structural Design Criteria

Requirement: Paragraph 4.22 - "There are no detail requirements for the prevention of buffeting. However, aircraft shall be free from buffeting over the entire permissible speed range except that buffeting may be acceptable as a stall warning if it occurs at a speed not exceeding 10 mph above the stalling speed."

Deviation: The airplane shall be free from objectionable buffeting over the entire permissible speed range.

Reason for Change and Remarks: No definite stall point exists.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
8	3.4	Structural Design Criteria

Requirement: Paragraph 4.41 - "The structural vibration survey shall be conducted in accordance with the requirements of ANC Bulletin ANC-12."

Deviation: The requirements of Bulletin ANC-12 shall be as outlined in Contractor's Reports No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations", and ZU-8-002 "Outline of MX-1554 Vibration Tests" both of which are subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
9	3.4	Structural Design Criteria

Requirement: Paragraph 5.43 - "Requirements for flutter prevention of such devices as dive brakes, dive pull-out flaps, spoilers, scoops, etc., are given in AAF Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
10	3.4	Structural Design Criteria

Requirement: Paragraph 5.441 - "The requirements for the static balance of control surfaces to prevent flutter are given in Specification 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
11	3.4	Structural Design Criteria

Requirement: Paragraph 5.442 - "The requirements for dynamic balance of control surfaces and the calculations involved in determining dynamic balance may be found in Chapter 4, Flutter, Vibration and Noise, and AAF Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
12	3.4	Structural Design Criteria

Requirement: Paragraph 6.120 - "Rigid structure shall be provided to support the crew members at all ditching stations for the load factors specified in Specification No. R-1803-5."

Deviation: Refer to Deviation No. 2.

Reason for Change and Remarks: Same as for Deviation No. 2.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
13	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.415 - "All aircraft shall be equipped with instrument-flying enclosures that can be opened and closed in flight."

Deviation: Instrument-flying enclosures shall not be required.

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
13	3.7.1.3.1	Pilot's Compartment (Cont)

Reason for Change and Remarks: Safety of the pilot would be impaired during ejection if time to remove the enclosure were not available. The enclosure curtains interfere with ventilating of cockpit at high speeds. The temperatures at canopy walls are sufficiently high to damage film at high speed flight.

* * * *

14	3.8.3	Auxiliary Landing Gear

Requirement: Paragraph 7.10 - "Any aircraft equipped with a tricycle gear shall be provided with a tail skid or buffer ...."

Deviation: A tail skid or buffer shall not be required.

Reason for Change and Remarks: To save weight plus experience with the XF-92 airplane indicates that a tail skid or buffer is not necessary.

* * * *

15	3.8.2.3	Tires and Tubes - Main Landing Gear

Requirement: Paragraph 7.221 - "In the selection of main wheel tires the maximum alternate gross weight shall be considered to be divided equally between the main wheels with no allowance being made for loads being carried by the auxiliary wheel."

Deviation: In the selection of main wheel tires the maximum alternate gross weight shall be considered to be divided among the nose and main wheel tires in accordance with their respective static reactions.

Reason for Change and Remarks: It is the Contractor's understanding that this method of tire rating is approved by the CAA and is currently being considered for approval by the USAF. Weight saving of 8 pounds per airplane over 16 ply tire required to meet the specification.

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
16	3.8	Alighting Gear

Requirement: Paragraph 7.60 - "Air loads existing at 150% of sea level stalling speed with flaps shall appear to act on the landing gear installation."

Deviation: Air loads existing at 270 knots, 237% of the speed attainable with $C_L = 0.75$ and airplane weight 21,500 pounds, shall appear to act on the landing gear installation.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary. In addition, this airplane is not equipped with flaps.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
17	3.8	Alighting Gear

Requirement: Paragraph 7.60 - "it shall be possible to operate the landing gear at all speeds up to 175 percent of the stalling speed."

Deviation: It shall be possible to operate the landing gear at all speeds up to 270 knots, 237 percent of the speed attainable with $C_L = 0.75$ and airplane weight 21,500 pounds.

Reason for Change and Remarks: Due to the flying characteristics of this airplane it is necessary to design the alighting gear to operate at higher speeds than 175% of stalling speed. Since there is no definate stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

18 3.2.11 Standard Parts

Requirement: Paragraph 8.20 - Rivets. "All rivets must conform to those shown in the Army Air Forces Standards Book."

Deviation: Corrosion-resistant steel rivets conforming to Contractor's standards Q-4304 and Q-4310 may be used.

Reason for Change and Remarks: These Contractor standards have been approved by AMC letter.

* * * *

19 3.2.11 Standard Parts

Requirement: Paragraph 8.21 - Bolts. "AN standard bolts and screws shall be used in the primary structure of the aircraft."

Deviation: NAS 464 and NAS 495 series bolts may be used. Corrosion-resistant screws may be used.

Reason for Change and Remarks: The use of these bolts has been approved by ANA Bulletin 147. Corrosion-resistant screws are for use in the vicinity of compass installations where nonmagnetic materials are required.

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20 3.2.11 Standard Parts

Requirement: Paragraph 8.21 - Bolts. "Bolts loaded in shear and subject to reversals of load shall be installed in close tolerance holes with no perceptible play."

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
20	3.2.11	Standard Parts (Cont)

Deviation: Shear bolts in pin-jointed structures subject to reversals of load shall be installed in close tolerance holes with no perceptible play. The term "no perceptible play" is interpreted as the actual hole diameter not exceeding the nominal bolt or pin diameter by more than 0.0015 inch for bolts or pins of 1.000 inch diameter or less, and by more than 0.0020 inch for bolts or pins with diameters larger than 1.000 inch up to and including 1.625 inch.

Reason for Change and Remarks: To define the requirements stated above in accordance with the Contractor's practice.

* * * *

21	3.2.11	Standard Parts

Requirement: Paragraph 8.22 - Nuts. "All nuts used in aircraft structures which may require removal shall be either castellated nuts conforming to Specification No. MIL-N-6034, to be locked with cotter pins, or self-locking nuts conforming to Specification No. AN-N-5 or AN-N-10."

Deviation: Applicable, except that nuts for NAS series bolts may be used, and except that nuts for corrosion-resistant steel screws may be used.

Reason for Change and Remarks: To permit use of nuts corresponding to nonstandard bolts and screws authorized.

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
22	3.20.1.2	Ground Air Conditioning

Requirement: Paragraph 8.412 - "An opening in the engine cowling for ground heaters will be provided for by either an accessory door with minimum dimensions of 12 inches diameter or an easily removable section of cowling of equivalent size.

Deviation: No engine cowling is required. However, provision shall be made for ground heating of the accessory compartment.

Reason for Change and Remarks: Engine cowling is not applicable to this type of power plant installation. Means will be provided for obtaining ground heat for engine accessories.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
23	3.4	Structural Design Criteria

Requirement: Paragraph 8.42 - "Cowling and its supporting structures shall be designed to the strength requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

24	3.22.4	Hoisting

Requirement: Paragraph 8.511 - Hoisting. "Hoisting slings shall be provided and carried as special equipment."

Deviation: Provision for carrying hoisting slings in the airplane is not required.

Reason for Change and Remarks: Insufficent space in the airplane available for stowage.

* * * *

25	3.20.1.2	Ground Air Conditioning

Requirement: Paragraph 8.52 - Ground Handling. ".....provision will be made in the aircraft fuselage at applicable sta-

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
25	3.20.1.2	Ground Air Conditioning (Cont)

tions requiring ground heating for attaching of AF standard 12-inch ground heater ducts."

Deviation: Provision for attachement of the specified ground heater ducts is not required.

Reason for Change and Remarks: Provision shall be made for obtaining ground heat for the cockpit as described in this model specification.

* * * *

26 3.4 Structural Design Criteria

Requirement: Paragraph 8.520 - "The alighting gear and its supporting structure shall be designed to the towing requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

27 3.4 Structural Design Criteria

Requirement: Paragraph 8.521 - "The mooring fittings and the structure to which they are attached shall be designed in accordance with Specification No. C-1803. . . . ."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
27	3.4	Structural Design Criteria (Cont)

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

28 3.22.3 Mooring Provisions

Requirement: Paragraph 8.521a - "For aircraft of 16,000 pounds design gross weight or less, mooring fittings attached to the wing, one on each side of the plane of symmetry and as near as practicable to the middile of the semi-span, shall be provided. For larger aircraft, two wing mooring points on each side of the plane of symmetry shall be provided."

Deviation: One wing mooring point on each side of the plane of symmetry shall be provided.

Reason for Change and Remarks: Due to the short wing span it is not so practical to provide two mooring points on each side.

* * * *

29 3.4 Structural Design Criteria

Requirement: Paragraph 8.83 - "For design strength and rigidity requirements see AAF Specification No. C-1803."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
29	3.4	Structural Design Criteria (Cont)
	Deviation:	The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

30	3.4	Structural Design Criteria
	Requirement:	Paragraph 9.307 - "The design of the control system, and its structural supports shall be based on rigidity and the elimination of deflection, as well as upon the ultimate strength requirements of Specification No. C-1803."
	Deviation:	The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

31	3.10.1	Primary Flight Control System
	Requirement:	Paragraph 9.308 - "All cables shall be separated by at least 3 inches, preferably more."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
31	3.10.1	Primary Flight Control System (Cont)

Deviation: Cable spacing may be closer than 3 inches where necessary.

Reason for Change and Remarks: Maximum cable spacing will be provided; however, in some cases it is impracticable to maintain three-inch spacing due to limited space available.

* * * *

32	3.10.1 3.10.3	Primary Flight Control System Trim Control System

Requirement: Paragraph 9.31 - "Duplicate Controls". This paragraph, under certain conditions, requires duplicate control system.

Deviation: A single control system shall be provided for each of the primary control systems.

Reason for Change and Remarks: The delta wing configuration requires a control system mixer, which does not lend itself to a practical dual system. Dual cable systems will unduly increase the control system friction forces and weight.

* * * *

33	3.10.1.1	Flight Station Controls

Requirement: Paragraph 9.322 - "For aircraft not equipped with fixed machine guns, pilot's control stick pistol-type grip, Drawing No. AN8003, shall be used."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

33 3.10.1.1 Flight Station Controls (Cont)

Deviation: The control stick design and control switches shall conform to the requirements of the automatic fire control equipment installed in the airplane.

Reason for Change and Remarks: The automatic flight equipment installed in the airplane introduces new requirements not covered by the HIAD.

* * * *

34 3.10.1.1 Flight Station Controls

Requirement: Paragraph 9.324 - "The aircraft structure, auxiliary controls, furnishing, instruments, etc., shall clear by at least 1-1/2 inches the cockpit primary air control items in all positions ...."

Deviation: Minimum clearance between control components and aircraft structure may be less than 1-1/2 inches.

Reason for Change and Remarks: Maximum clearance will be provided; however, in some cases it may be impractical to maintain the full clearance specified in the HIAD.

* * * *

35 3.14.1 Instruments

Requirement: Paragraph 9.403 - "Tab position indicators shall plainly identify by day or night the main control surface affected by the trim control, ..."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
35	3.14.1	Instruments (Cont)

Deviation: Tab position indicators shall not be required. A light shall be installed to indicate when the tab surfaces are not in a neutral position.

Reason for Change and Remarks: USAF request at cockpit conference. The pilot needs only to know trim position prior to take-off. Trimming to be accomplished by ground crew prior to take-off.

* * * *

36 3.12.11 Propulsion System Controls

Requirement: Paragraph 9.604 - "In single-engine aircraft, at least 6 inches clearance shall be provided between the handle of the throttle lever or power lever and the handle of the control located nearest to it."

Deviation: The power control lever clearance may be reduced from the HIAD requirement.

Reason for Change and Remarks: The ejection seat clearance, landing gear lever, oxygen panel location, and automatic flight control requirements prevent adherence to this specification.

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37 3.15.2 Pneumatic System

Requirement: Paragraph 10.303 - "Assume air bottle pressure to be 1800 psi. All air bottles used for emergency operation of hydraulic or pneumatic systems shall be selected for an

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
37	3.15.2	Pneumatic System (Cont)

initial air charge of 1800 psi. (Pressure lower than this results in the use of larger sized bottle and higher pressure is not available in service.)"

Deviation: Compressed air bottle pressure may be 3000 psi.

Reason for Change and Remarks: To agree with design storage pressure of the pneumatic system. The airplane carries a 3000 psi compressor.

* * * *

38	3.10.1	Primary Flight Control System

Requirement: Paragraph 10.410 - "Control Cables shall conform to Specifications No. AN-C-43 or AN-C-48."

Deviation: Roebling "Stratocord" or equivalent may be used in lieu of cables conforming to Specifications No. AN-C-43 or AN-C-48.

Reason for Change and Remarks: The use of Roebling "Stratocord" or equivalent simplifies the system by elimination of tension regulators and reduces weight.

* * * *

39	3.20.1	Air Conditioning

Requirement: Paragraph 12.341 - "Closing of the shut-off valves shall actuate simultaneously the ram air-inflow valve mechanism so as to insure continued cabin ventilation when the pressure source is not used."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
39	3.20.1	Air Conditioning (Cont)

Deviation: It shall not be required that the closing of the shut-off valve actuate simultaneously the ram air-inflow valve mechanism.

Reason for Change and Remarks: Simultaneous actuation of the ram air-inflow valve mechanism with operation of the emergency shut-off valve would dump the cockpit pressure with attendant adverse physiological consequences at high altitudes.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
40	3.20.1	Air Conditioning

Requirement: Paragraph 12.342 - "A valve in the ram air line shall be mechanically or electrically linked with both the emergency pressurized air shut-off valve described in 12.341, Emergency Shut-off Valve, and the cabin air dump valve described in 12.360, General. The linkage shall provide for positive actuation of the three valves when operating personnel desire to actuate any one of the three."

Deviation: A valve in the ram air line shall be mechanically or electrically linked with the cabin air dump valve described in 12.360, General. The linkage shall provide for positive operation of the two valves when operating personnel desire to actuate either valve.

Reason for Change and Remarks: In conformance with the deviation to Paragraph 12.341. The valve in the ram air duct should not be linked mechanically or electrically with the emergency shut-off valve.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1(Cont)
41	3.20.1	Air Conditioning

Requirement: Paragraph 12.345 - "Water Separator and Drain"

Deviation: Water separator and drain need not be required.

Reason for Change and Remarks: Provision for water separator is deemed inadvisable because of the extremely short duration of sea-level flight in the normal tactical application of the airplane. Such provisions impose penalties in weight, space and increased pressure drop in the low pressure pneumatic system.

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Deviation	Paragraph	AMC Manual 80-1(Cont)
42	3.20.1	Air Conditioning

Requirement: Paragraph 12.351 - "Control of Rate of Pressure Change"

Deviation: Control of rate of pressure change need not be provided.

Reason for Change and Remarks: In conformance with paragraph 12.350 for aircraft with one crew member and a service ceiling over 50,000 feet altitude, there will be one schedule of cabin pressure only. Therefore, the necessity for switching from normal to combat is removed.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
43	3.20.1	Air Conditioning

Requirement: Paragraph 12.372 - "Cabin Air Flow and Mixing Flow Package for Jet-Propelled Aircraft"

Deviation: Considered not applicable per reason noted.

Reason for Change and Remarks: Since the air turbine output is utilized for generation of electrical and pneumatic power, a temperature actuated dual mixing valve conflicts with the proper functioning of the proposed system.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
44	3.20.1	Air Conditioning

Requirement: Paragraph 12.51 - "Maximum ventilating air rate will usually be determined by cabin-temperature requirements but shall be limited to that value which will not permit air movement past seated crew members at more than 200 feet per minute air velocity."

Deviation: Air movement past seated crew members shall be kept to a minimum but may exceed 200 feet per minute air velocity.

Reason for Change and Remarks: Due to the small cockpit size and high flight speeds the airflow necessary for conditioning the cockpit at altitudes will produce local air velocities in excess of 200 feet per minute.

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
45	3.12.9.6	Piping and Fittings

Requirement: Paragraph 13.310 - "Metal tubing outside diameters shall be restricted to the following sizes: 1/4, 3/8, 1/2, 5/8, 3/4, 1, 1-1/4, 1-1/2, 1-3/4, 2, 2-1/2, and 3 inches."

Deviation: Tubing size larger than 3 inches may be used.

Reason for Change and Remarks: To meet the refueling requirements may require tubing size larger than 3 inches.

* * * *

46 3.12.9.6 Piping and Fittings

Requirement: Paragraph 13.32 - "Hose inside diameters shall be restricted to the following sizes: 1/4, 3/8, 1/2, 5/8, 3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, and 3 inches."

Deviation: Hose sizes larger than 3 inches inside diameter may be used.

Reason for Change and Remarks: Fuel flow rates may require larger sizes.

* * * *

47 3.12.9.6 Piping and Fittings

Requirement: Paragraph 13.33 - "All fittings such as hose nipples, elbows, flared tube fittings, etc., shall conform to

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

47 3.12.9.6 Piping and Fittings (Cont)

Army-Navy or Air Force Standards. The end fittings used with the hose assembly conforming to Drawing AN6264 shall conform to Drawing AN792."

Deviation: Fittings shall be of light weight as approved by WADC.

Reason for Change and Remarks: Light weight fittings are used to save weight.

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48 3.12.9.5 Vent System

Requirement: Paragraph 13.344 - "All vents and drain lines shall terminate at a point outside the aircraft, passing through resilient grommets in the engine cowling where necessary to prevent chaffing, and they shall be so located or formed that drainage cannot be returned to any part of the aircraft structure or enter the exhaust wash from either upstream or downstream. Drain lines shall be easily accessible for draining from the outside of the aircraft."

Deviation: Routing and dumping of drain and vent lines shall be as approved by mock-up.

Reason for Change and Remarks: Space provisions for reservoir capacity and drain line routing can best be determined on the mock-up.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
49	3.12.9.3	Tanks (Fixed) Fuel

Requirement: Paragraph 13.410 - "All combat aircraft, including fighter, attack, photographic, cargo (personnel carriers), and bombardment, that have a tactical operating radius of action of fewer than 3,000 nautical miles shall have internal combustible fluid tanks that afford 100 percent protection against gunfire for the power plant fluid systems."

Deviation: (a) Self-sealing tanks are not provided.

(b) Fuel tanks are pressurized.

Reason for Change and Remarks: (a) Self-sealing tanks are ineffective against probable large calibre armament of enemy bombers. Self-sealing tanks reduce fuel capacity and increase weight. (b) High altitude operation requires pressurization to prevent fuel vaporization. Pressure is used for fuel transfer between tanks.

* * * *

Deviation	Paragraph	
50	3.12.9.3	Tanks (Fixed)

Requirement: Paragraph 13.46 - "Internal nonself-sealing fuel tanks shall be tested to Specification No. 28637.

Deviation: Applicable, except that the vibration tests of Specification No. AN-V-7, as required by Specification No. 28637, shall not be required.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

50 3.12.9.3 Tanks (Fixed) (Cont)

Reason for Change and Remarks: The fuel tanks to be used in the YF-102 Airplane are integral tanks and will be tested during static tests of the airplane. The test equipment that would be required to conduct vibration and sloshing tests on the wing makes it impracticable to comply with Specification No. AN-V-7.

* * * *

51 3.5.1 Wing - Description and Components

Requirement: Paragraph 13.74 - "Integral fuel tanks which consist of the aircraft structure sealed by means of elastic films, gaskets, caulking compounds, etc., (as differentiated from 'bladder' type cells) shall not be used in Air Force aircraft."

Deviation: Integral fuel tanks shall be used.

Reason for Change and Remarks: Considerable previous experience by this Contractor in designing and fabrication of integral fuel tanks, both military and commercial application, have shown them to be satisfactory. Integral tanks provide maximum fuel capacity and minimum weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

52 3.11 Engine Section

Requirement: Paragraph 15.26 - "Quick-Change Power Plant"
Paragraph 15.270- "Quick-Change Requirements"
Paragraph 15.28 - "Maintenance-Inspectien, Cleaning and Adjustment"
Paragraph 15.29 - "Maintenance-Removal and Replacement"

Deviation: Requirements of above shall be as approved by the Mock-up Board.

Reason for Change and Remarks: Mock-up is necessary to determine degree of compliance with above requirements.

* * * *

53 3.12.9.6 Piping and Fittings

Requirement: Paragraph 15.421 - "The fuel-outlet fitting from all fuel tanks, except external jettison tanks, shall be a booster-pump flange . . . ."

Deviation: Booster-pump flange shall not be required on tanks 1 and 2, left and right.

Reason for Change and Remarks: Tube outlets will be used on tanks 1 and 2, left and right, booster pumps are not used on these tanks.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
54	3.12.9.5	Vent System

Requirement: Paragraph 15.424 - "One vent connection shall be installed for each fuel tank and located at the high point of the tank when the aircraft is in normal ground position."

Deviation: Conventional type vent system shall not be provided.

Reason for Change and Remarks: Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
55	3.12.8.1 3.12.9.13	Lubricating System - Description and Components Refueling Provisions

Requirement: Paragraph 15.425a - "Cap shall conform to AAF Drawing No. 39B5435 with an Adapter in accordance with AAF Drawing No. 39B5294 or 44B13830."

Deviation: Fuel and oil caps may be other than that specified, which are no longer acceptable for new installations.

Reason for Change and Remarks: Contractor desires to use latest approved AF oil and emergency gravity refuel caps.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
56	3.11	Engine Section

Requirement: Paragraph 15.62 - "All fuel-tank compartments (considering each group of connected cells as a tank), engine compartments, interior of wing, and interior of fuselage proper shall be isolated from each other with a liquid-, gas-, and fire-tight seal."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
56	3.11	Engine Section (Cont)

Deviation: A vertical fume-tight aluminum alloy bulkhead shall be installed forward of the compressor inlet. A horizontal fuel-tight aluminum alloy shroud extending from the fume-tight bulkhead aft, under the compressor section, to the wheel bay, shall be installed. A vertical stainless steel fire wall in the plane of the engine fire wall shall be installed, which will isolate the turbine and afterburner compartments from the rest of the airplane.

Reason for Change and Remarks: The Contractor considers that the above proposed isolation of fuel, engine compartments, and fuselage is adequate for this type of airplane. An appreciable weight saving is realized in following this proposal.

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57	3.12.9.3	Tanks (Fixed) - Fuel

Requirement: Paragraph 15.63 - "The inside of the tank compartments should be sprayed with anti-sparking paint such as clear lacquer."

Deviation: Anti-sparking paint shall not be used in conjunction with integral tanks.

Reason for Change and Remarks: The Contractor's past experience shows that anti-sparking paint is of no value.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
58	3.12.9.10	Drainage Provisions

Requirement: Paragraph 15.63 - "Each compartment will be drained by a 1/2-inch hole at the low point in normal flight altitude and on the ground, using two holes if necessary. These drain holes shall be at least 5 feet away from open exhaust and shall not be upstream or downstream of the exhaust wash."

Deviation: It shall be permissible for the drain holes to be located upstream of the exhaust wash.

Reason for Change and Remarks: Due to the configuration of the airplane, it is impracticable to comply with the above requirements, drain holes will be located upstream of the exhaust wash.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
59	3.11.5 3.12.6	Fire Walls Exhaust System

Requirement: Paragraph 15.67 - "Insulation blankets shall be protected from damage during handling by a layer of wire screen on the inside and outside surfaces."

Deviation: Wire screen will be used on the outside surfaces only of insulation blankets.

Reason for Change and Remarks: Experience has indicated a screen on the outside only provides adequate protection of the insulating blanket foil, and effects a desirable weight saving.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
60	3.2.2	Materials
	3.11	Engine Section
	3.11.5	Fire Walls

Requirement: Paragraph 15.68 - "All aircraft components, including equipment and structure that might be critically affected by fires occurring in or around the engine, shall be adequately protected by stainless steel shrouding or fire walls."

Deviation: It shall be permissible to use titanium in lieu of stainless steel for fire walls or shrouding.

Reason for Change and Remarks: Titanium is recognized as a suitable material for fire walls and shrouds, also considerable weight saving can be obtained by using titanium in lieu of stainless steel.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
61	3.11	Engine Section

Requirement: Paragraph 16.12 - "Maximum Temperatures - Maximum Allowable Temperature. - Structure, aluminum alloy (75S-T), 200°F (93.3°C)."

Deviation: It shall be permissible for aircraft structural members to be heated to more than 200°F.

Reason for Change and Remarks: In some instances aerodynamic heating alone will heat aircraft components in excess of 200°F. Allowance for strength reduction, due to high temperatures, will be made.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
62	3.12.8	Lubricating System

Requirement: Section 16.2, Lubrication Systems

Deviation: This section of the handbook is not applicable to this airplane.

Reason for Change and Remarks: The turbo-jet engines specified for this airplane are equipped with an integral oil system and no air frame connections are required, except for installing an additional air-to-oil cooler and venting the accessory gear box.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
63	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.22 - "The lubricating system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. AN-O-8."

Deviation: The lubrication system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. MIL-L-7808.

Reason for Change and Remarks: In accordance with Pratt and Whitney J-57 Information Letter No. 43, dated 23 November 1951, the synthetic oil for use in JT3 engines is Pratt and Whitney Specification No. 521, Government Agency Specification No. MIL-L-7808.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
64	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.262 - Oil Cooler Selection - (Same as Oil Cooler Selection under 14.24) - "Oil coolers used in production aircraft shall comply with the requirements of Specification No. AN-C-75."

Deviation: Oil coolers shall conform to Specification No. MIL-C-5637 except for shape. The oil for testing the cooler shall be in accordance with Specification No. MIL-L-7808. The cooler shall be of the plate type in lieu of the tubular type construction.

Reason for Change and Remarks: To permit use of latest type coolers to save weight.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
65	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.263b - "Air entrances shall be so lcated as to prevent admitting air that has been heated in any manner from any source on the airplane."

Deviation: Air entrances shall be so located as to provide cooling air of sufficient volume and temperature to maintain the oil temperature at 200°F maximum.

Reason for Change and Remarks: Cooling air exhausted from suitable airplane compartments will be used as oil cooler cooling air. A survey of the airplane cooling system indicates that sufficient low-temperature air is available to cool the oil in this manner.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
66	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.263e - "Oil Cooler Mounting (Same as Mounting under 14.252)."

Deviation: Not applicable to type of oil cooler design proposed.

Reason for Change and Remarks: Mounting requirements specified are not applicable to type of coolers being used.

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67	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.263f - "Oil Temperature Regulating Valve - (Same as Oil Temperature Regulating Valve under 14.254)"

Deviation: Not applicable to type of design proposed.

Reason for Change and Remarks: Plate-type oil coolers do not require surge protection.

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68	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.278 - Engine-Breather Lines - "This point shall be so located that oil or fumes will not be discharged onto the windshield or flow into the cockpit and shall be visible to the pilot in flight."

Deviation: It is not necessary that the breather line terminate at a point visible to the pilot in flight.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
68	3.12.8.1	Lubricating System (Cont)

Reason for Change and Remarks: Since the engine breather connection is located approximately 22 feet aft of the pilot, it is not practical to run the breather line forward.

* * * *

69	3.12.9.1	Fuel System - Description and Components

Requirement: Paragraph 16.302 - "The entire fuel system shall be designed for the use of Specification No. AN-F-58 fuel. It shall also be capable of satisfactory operation with Specification Nos AN-F-32 and AN-F-48 fuels."

Deviation: Fuel system shall be designed to operate with fuel covered by Specification No. MIL-F-5624A, Grade JP-4, and in emergency on fuel covered by Specification No. MIL-F-5572.

Reason for Change and Remarks: It is understood that JP-4 fuel will be procured by the Government for use in jet aircraft.

* * * *

70	3.12.9.1	Fuel System - Description and Components

Requirement: Paragraph 16.31 - "Design Requirements"

Deviation: In lieu of the requirements set forth in the HIAD, Section 16.31, the fuel system of the aircraft shall be designed as shown on Convair Drawing No. 8-20601, which shall be submitted to WADC for design approval.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
72	3.12.9.5	Vent System (Cont)

Deviation: The fuel tank internal pressure shall be sufficient to accomplish the transfer of fuel from tank to tank as required for automatic c-g control.

Reason for Change and Remarks: This airplane incorporates a combination fuel tank purging and tank pressurization system which eliminates the conventional vent system requirements.

* * * *

73 3.12.9.2 Pumps

Requirement: Paragraph 16.351 - "Booster Pumps"

Deviation: The following shall apply in lieu of the requirements specified in Paragraph 16.351. Suitable alternating current centrifugal booster pumps shall be provided which may or may not be mounted directly on the bottom of the tank, depending on the results of suitable altitude simulated tests as conducted by the Contractor to determine desired locations in relation to the space available in the airplane. Drain lines are not required on alternating current pumps.

Reason for Change and Remarks: Conventional booster pump mounting and installation methods cannot be followed due to the depth of the fuel tanks.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
74	3.12.9.1	Controls - Fuel System

Requirement: Paragraph 16.352 - "Fuel valve controls shall be marked red ...."

Deviation: Fuel valve controls need not be marked red, but shall be suitably identified.

Reason for Change and Remarks: The fuel control panel will utilize edge lighting which does not lend itself for special color identification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
75	3.12.9.8	Fuel System - Strainer and Filters

Requirement: Paragraph 16.353 - "Fuel strainers in accordance with Drawings AN4108, AN4109 and AN4145 shall be used."

Deviation: Fuel strainers, simular to AN4109, shall be provided with a capacity sufficient to handle the larger fuel flow. Strainers may be of either cast or sheet metal construction.

Reason for Change and Remarks: Fuel strainers per Drawing No. AN4109 are of insufficient capacity.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | AMC Manual 80-1 (Cont)

76 3.14.1 Instruments

Requirement: Paragraph 19.0 - "The instruments and instrument boards required shall be installed in accordance with Specification No. AN-I-2."

Deviation: Instruments and instrument boards required shall be installed in accordance with Specification No. MIL-I-5997, except as specified herein.

Reason for Change and Remarks: To establish the specification the Contractor proposes to use.

* * * *

77 3.14.3 Installation - Instruments

Requirement: Page 19-4, Figure 19-3 - "Installation of Direction of Gyro and Gyro Horizon."

Deviation: The specified instruments may not be installed in accordance with Figure 19-3.

Reason for Change and Remarks: The Contractor proposes to use small instruments to conserve space. The space limitations of the instrument panel makes it impracticable to comply with Figure 19-3.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
80	3.17.1.1	Control Console

Requirement: Paragraph 20.2 - "Space and mounting provisions shall be made for the original panels to be easily replaced by longer panels so that other panels may be added in case of a change in radio or radar requirements after completion of the airplane design. The extra space provided shall amount to 20 percent of that required for the installed controls."

Deviation: Twenty percent space of that required for the installed controls shall not be provided.

Reason for Change and Remarks: Due to quantity of equipment installed and to type of aircraft, there is insufficient space available to meet the above requirement.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
81	3.18.6.2 3.18.6.3	Armor Plate Cone of Fire Protection

Requirement: Paragraph 21.920 - "Protection shall be provided in all tactical AF aircraft for the crew and vital aircraft components against gunfire in accordance with the following general requirements."

Paragraph 21.921 - "Fighter Aircraft" - This paragraph gives specific requirements for fighter aircraft armor.

Deviation: Passive defense shall not be provided.

Reason for Change and Remarks: Unnecessary weight. The low grazing angles of the fuselage forward of the pilot, plus the rugged radome and the mass of radar equipment forward of the pilot are considered to be ample protection.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
82	3.19.1.1	Safety Belt and Shoulder Harness

Requirement: Paragraph 23.110 - "All crew and passenger seats shall be equipped with a belt; aircraft safety, Type B-14."

Paragraph 23.111 - "All crew and passenger seats, except those permanently faced rearward, shall be provided with the belt, safety, shoulder harness, Type B-16.

Deviation: A Type B-18 safety belt and a Type G-3 shoulder harness shall be installed.

Reason for Change and Remarks: WADC specified above equipment for this airplane.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
83	3.16.7	Controls - Electrical

Requirement: Paragraph 23.14 - "Heated clothing rheostat, Type Q-1B, in accordance with Specification No. 94-32357, shall be installed at each crew station in all bombers and large aircraft of 15,000 pounds gross weight or larger ...."

Deviation: Heated clothing rheostat shall not be required.

Reason for Change and Remarks: Heated clothing not required in that the cockpit is air conditioned.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

84 3.19.2.4 Map and Data Case

Requirement: Paragraph 23.230 - Data Case - "To provide an aircraft data case, Drawing No. 36G2873, shall be installed in all aircraft."

Paragraph 23.234 - Map Case - "Aircraft having a cruising range over 600 miles shall be equipped with a map case at least 9 x 12 x 4 inches."

Deviation: A combination data and map case shall be provided.

Reason for Change and Remarks: Relatively short flight duration and large amount of electronic navigational aids installed, obviate need for a separate map case. This case will be the size specified in Paragraph 23.234, except for width, which will be as nearly to 4 inches as space permits.

* * * *

85 3.2.2 Materials

Requirement: Paragraph 24.00 - "Aircraft designers shall utilize materials and processes approved for USAF use, which are listed not only in the USAF Index of Specifications and Bulletins Approved for USAF Procurement, but also in USAF Bulletin No. 23."

Deviation: (a) Porous sintered stainless steel may be used for wing and fin leading edges, and engine air intake duct lips. (Refer to Deviation No. 60 regarding use of titanium in lieu of stainless steel.)

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
85	3.2.2	Materials (Cont)

(b) The wing tips may be of material not listed in USAF Index of Specifications or USAF Bulletin No. 3.

(c) Armco 17-7 and 17-4 heat-treatable stainless steel sheet and bar may be used.

Reason for Change and Remarks: (a) The wing and tail leading edges will be de-iced by means of heated air which escapes through the porous metal skin. (Refer to Deviation No. 60 regarding use of titanium in lieu of stainless steel.) (b) The wing tips are constructed of honeycomb sandwich type material as covered by a Convair specification to be submitted to WADC for approval. (c) Combination high strength and ease of fabrication.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
86	3.4	Structural Design Criteria

Requirement: Paragraph 25.1 - "Demonstration flights of aircraft shall be conducted in accordance with Specification No. R-1803-11."

Deviation: The requirements shall be as outlined in Contractor's Report No. ZM-8-002 "Structural Integrity Flight Demonstration" which shall be subject to WADC approval, shall be used in lieu of Specification No. R-1803-11 dated 1 August 1947.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range, and purpose of the aircraft.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-B-2a, dated 20 August 1947 - Brake System; Aircraft, Design of
87	3.8.2.2	Brake Control System

Requirement: Paragraph D-4a - "The desired shape and travel of the brake pedals are shown on Figures 1 and 2 respectively."

Deviation: Figure 1 - It shall be permissible to use the following dimensions:

2.10" in lieu of 3"
1.41" RAD in lieu of 2-13/16 RAD
5.05" width in lieu of 5-5/8"

Reason for Change and Remarks: To permit the use of same rudder and brake pedals used on the Model T-29 Airplanes.

* * * *

88	3.8.2.2	Brakes

Requirement: Paragraph C-1 - "This capacity shall normally consist of 100 stops at 10 feet per second per second deceleration at the design gross weight condition of the airplane or 0.9 times the maximum alternate weight, whichever is larger."

Deviation: This capacity shall consist of 50 stops at 10 feet per second per second deceleration at the design gross weight of the airplane, as referred to in Paragraph 3.14.1.1.

Reason for Change and Remarks: An appreciable weight saving is realized by using 50 stop brakes. Also, the use of a brake parachute and high induced drag during landing attitude reduces brake requirement.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-J-5(2), dated 26 November 1947 - Jack Pads; Design and Installation of (For Aircraft)
89	3.22.2	Jacking Provisions
	Requirement:	Paragraph E-1a(2) - "Aircraft having a gross weight between 19,000 and 10,000 pounds shall be provided with four jack pads on the wings or nacelles (two on each side)."
	Deviation:	Two jack pads shall be installed on the wing (one on each side).

Reason for Change and Remarks: Due to the short span of the wing it is not practical to use two jack pads on each side.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AN-I-21A(2), dated 2 May 1947, Interchangeability and Replaceability of Component Parts for Airplanes
90	3.2.5	Interchangeability and Replaceability

Requirement: Specification No. AN-I-21A(2).

Deviation: Specification No. AN-I-21A(2) shall not be applicable to the first or second airplane.

Reason for Change and Remarks: The first two airplanes are to be fabricated by the use of experimental type of tooling.

* * * *

91	3.2.5	Interchangeability and Replaceability

Requirement: Specification No. AN-I-21A(2).

Deviation: The component parts of the airplane manufactured subsequent to number two airplane will be interchangeable or replaceable, as the case may be, as specified in a list that is in general accordance with Specification No. AN-I-21 to be prepared by the Contractor and submitted to WADC for approval.

Reason for Change and Remarks: To establish the degree of interchangeability and replaceability.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. R-1800-E(5), dated 28 May 1945 - Aircraft , General Specification for
92	None	

Requirement: Paragraph D-15 - "At least the following primary structural assemblies, if fabricated of ferrous materials, shall be magnetically inspected in accordance with Specification No. AN-I-32."

Deviation: Magnetic inspection shall be in accordance with Specification No. MIL-I-6868.

Reason for Change and Remarks: Specification No. AN-I-32 has been superseded by Specification No. MIL-I-6868.

* * * *

93 None

Requirement: Paragraph D-16 - "Radiographic inspection of structural castings shall be conducted in accordance with Specification No. AN-I-26 and the Handbook of Instructions for Airplane Designers."

Deviation: Radiographic inspection of structural castings shall be conducted in accordance with Specification No. MIL-C-6021 (Aer) and the Handbook of Instructions for Aircraft Designers, except as otherwise noted herein.

Reason for Change and Remarks: Contractor's procedure has been completely established to control casting production under the requirements of Specification No. MIL-C-6021(Aer).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B, dated 1 June 1948 - Stability and Control Characteristics for Airplanes
94	3.3.2.1	Stability and Control

Requirement: Paragraph 2.4 - "V_S indicated stalling speed, corrected for instrument and position error, at the gross weight corresponding to the specified condition."

Deviation: V_S shall be defined as that speed attainable with $C_L = 0.75$.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

* * * *

Deviation	Paragraph	
95	3.3.2.1	Stability and Control

Requirement: Paragraph 4.1 - "Dynamic Longitudinal Stability - The short period dynamic oscillation of normal acceleration produced by moving and quickly releasing the elevator control shall be damped to 1/10 amplitude in one cycle."

Deviation: The specified number of cycles to damp may be exceeded provided that the oscillations are definitely stable and the degree of damping is satisfactory to WADC. If a device is used to provide the desired damping, it shall be required that no dangerous oscillations can occur under any circumstances without such damping device.

Reason for Change and Remarks: The longitudinal damping characteristics of the XF-92A airplane observed during flight tests were satisfactory even though not compatible with specification requirements.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
96	3.3.2.1	Stability and Control

Requirement: Paragraph 4.2.1 - "The airplane shall possess positive static stick-fixed and stick-free longitudinal stability at all normal service loadings when flying with constant throttle setting under the conditions of Table II." ".... if the curve of the variation of stick force with air speed below the trim speed does not cross the zero force axis and a pull force is required to reduce the speed from trim."

Deviation: Applicable, except that at Mach numbers above 0.85 with the airplane trimmed at a Mach number of 0.85, the variation of elevator force and deflection with Mach number may be negative if the force changes involved are small and occur over a reasonably wide Mach number range.

Reason for Change and Remarks: A mild instability of stick force and angle will occur at transonic speeds, which is caused by an aft movement of the center of pressure with constant or decreasing control effectiveness. This effect is considered not to be a hindrance to the flying qualities because of the following:

(a) Forces involved are small.

(b) The time period is long enough to enable retrimming.

(c) The airplane is longitudinally stable.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
97	3.3.2.1	Stability and Control

Requirement: Paragraph 4.3.2 - "When the airplane is trimmed at any permissible speed, it shall be possible by use of the elevator alone to develop, at the trim speed, the maximum positive or negative lift coefficient or positive or negative limit load factor, whichever is reached first. This requirement shall apply to all of the configurations listed in Paragraph 2.2. with the exception of configuration WO."

Deviation: Applicable, except as limited by angle of attack corresponding to a $C_L = 0.75$ at stall speed, maximum available elevator deflection or maximum limit load factor.

Reason for Change and Remarks: An arbitrary angle of attack has to be selected and elevator control power be made consistent with an optimum power boost system in order that undue weight penalties do not occur.

* * * *

98	3.3.2.1	Stability and Control

Requirement: Paragraph 5.1.1 - "The damping of the lateral-directional oscillation with controls fixed and free shall be positive and shall be such that the time to damp to one-half amplitude and the period shall fall within the satisfactory area of the chart given in Figure 1."

Deviation: The specified number of cycles to damp may be exceeded provided that the oscillations are definitely stable and the degree of damping is satisfactory to WADC. If a device is used to provide the desired damping, it shall be required that no dangerous oscillations can occur under any circumstances without such damping device.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AAF Specification No. 1815B (Cont)

98 Reason for Change and Remarks: Satisfactory flying qualities of the airplane are expected even though the damping characteristics may not be compatible with the specification requirements.

* * * *

99 3.3.2.1 Stability and Control

Requirement: Paragraph 6.3.4 - "In rolls from straight or turning flight under the specified conditions at 10,000 feet altitude, with the rudder held fixed in the position required for steady flight prior to the roll, the ailerons or other lateral control device shall be sufficiently powerful to produce the peak rolling rates corresponding to the values given in Table V."

Deviation: Available roll rates above V_{max} (normal rated power) shall be subject to approval by WADC.

Reason for Change and Remarks: Additional investigations are required to establish the roll rates.

* * * *

100 3.3.2.1 Stability and Control

Requirement: Paragraph 7.1.1 - "The complete stall is considered to be the condition associated with breakdown of the airflow over the wing, and occurring immediately after the overall trimmed lift coefficient of the airplane reaches its maximum value, except that this maximum shall not be set by limitations of available longitudinal control power. The complete stall is generally characterized by the following changes in the flying characteristics of the airplane:

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AAF Specification No. 1815B (Cont)

100 Requirement (Cont)

(a) In straight flight, the airplane experiences one or more of the following: An abrupt downward pitching of the nose, or an abrupt dropping of the wing and the air speed reaches a minimum.

(b) In turning flight, the normal acceleration decreases markedly or the airplane rolls markedly."

Deviation: The stall condition is defined to occur at that attitude at which a C_L of 0.75 is obtained.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

* * * *

101 3.3.2.1 Stability and Control

Requirement: Paragraph 8.1.1 - "The control system should be capable of moving the control surfaces at rates up to 35 degrees per second for Class I and II airplanes and 50 degrees per second for Class III and IV airplanes under any aerodynamic hinge moments encountered."

Deviation: With accumulators fully charged, both systems operating and engine operating a normal rated power, it shall be possible to attain rates of surface deflection of 50 degrees per second for cylinder pressures below 1000 psi and 25 degrees per second for pressures up to 2000 psi, and oil temperatures above 80°F. The system shall be stalled at

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AAF Specification No. 1815B (Cont)

101 Deviation (Cont)

the design hinge moments corresponding to 3000 psi. Compliance with the foregoing requirements shall imply one simultaneous deflection of all flight controls from neutral to full throw and shall in no way restrict the controllability of the airplane.

Reason for Change and Remarks: This deviation is consistent with design and weight penalties.

* * * *

102 3.3.2.1 Stability and Control

Requirement: Paragraph 8.1.2 - "When the cockpit control is moved at its maximum rate to a given deflection, the control surface shall reach its corresponding deflection with a time lag not greater than 0.05 second."

Deviation: Time lags will be consistent with requirements for satisfactory control and stability in automatic and manually-controlled flight.

Reason for Change and Remarks: Lags not compatible with specification requirements for the slower surface rates will be sufficiently small that the control characteristics will be satisfactory.

* * * *

103 3.3.2.1 Stability and Control

Requirement: Paragraph 8.4.1 - "For airplanes having two or more completely independent and equivalent power control systems, the requirements of Paragraph 8.3.1 shall be met

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AAF Specification No. 1815B (Cont)

103 Requirement (Cont)

during the period of transfer from one system to another. Paragraphs 8.3.2, 8.3.3 and 8.3.4 do not apply to these airplanes."

Deviation: Applicable, except that each system shall be capable of providing half of the design hinge moment.

Reason for Change and Remarks: To enable use of independent dual systems.

* * * *

104 3.10.1 Primary Flight Control System

Requirement: Paragraph 3.1.3 - "The dead spots in the controls should not exceed ±0.1 inches motion of the pilot's cockpit controls."

Deviation: The dead spots in the controls shall not exceed ±0.2 inch motion of the pilot's cockpit controls.

Reason for Change and Remarks: The function design requirements of the airplane will not permit a simplified routing of the system to meet this requirement.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1816, dated 15 June 1945 - Spinning Requirements for Airplanes
105	3.3	Aerodynamics

Requirement: Paragraph B-1 - "This specification covers the spinning requirements of airplanes."

Deviation: The requirements of this specification shall be applicable to this airplane if it can be shown that spins may be encountered without the use of unusual airplane attitudes or pilot techniques, or both.

Reason for Change and Remarks: Available data indicate that the airplane may be spinproof.

* * * *

106	3.3	Aerodynamics

Requirement: Paragraph D-3a - References Paragraph D-2a which specifies "a one-hour spin test flight."

Deviation: One-half hour spin test flight.

Reason for Change and Remarks: To conform with airplane endurance and the intent of the specification.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	U.S. Air Force Specification No. 32300-E, dated 1 March 1949 - Electrical Equipment; Aircraft, Installation of - General Specification for
107	3.16.2.1 3.16.2.2	Direct Current Power Supply Alternating Current Power Supply

Requirement: Paragraph 3.6.4 - "Remote adjusting rheostats are not required on single generator aircraft provided the regulator is located so that adjustment can be accomplished from within the cockpit."

Deviation: No provisions shall be made to permit the adjustment of voltage in flight.

Reason for Change and Remarks: The duration of flight of this airplane does not warrant adjusting voltage in flight.

* * * *

Deviation	Paragraph	
108	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.6.5 - "On aircraft with one generator, the generator circuit shall conform to Figure 2. The total resistance from terminal "GEN" of the relay switch to terminal "B" of the regulator, thence from terminal "A" of the regulator to terminal "A" of the generator shall not exceed 0.25 of an ohm.

Deviation: The direct current generator circuit shall conform generally to Exhibit MCREXE22-89A.

Reason for Change and Remarks: WADC request per WADC Letter WCSWF/NMR/nlt dated 16 October 1951.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
109	3.16.2.1	Direct Current Power Supply

Requirement: Paragraphs 3.6.11 and 3.6.12 - "Generator circuit protectors and circuit breakers."

Deviation: Not applicable. Circuit protectors in the generator circuit shall be as shown on Figure 1 - MCREXE22-89A.

Reason for Change and Remarks: WADC requests that the generator circuit be installed in accordance with MCREXE22-89A.

* * * *

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
110	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.7.6 - "Generator controls consist of one ammeter per generator, one control switch per generator, one voltage adjusting rheostat per regulator, if required, one generator failure indicator light per generator and one voltmeter.' .... 'These controls shall be grouped together on the pilot's or engineer's electrical panel. On single generator aircraft the voltage adjusting rheostats are not required provided voltage adjustment can be accomplished from the cockpit."

Deviation:

1. A voltmeter shall not be required.
2. The ammeter shall be located on the instrument subpanel and not on the pilot's electrical panel.
3. It shall not be required that the voltage be adjusted from the cockpit.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
113	3.16.11.2	Signal Assemblies

Requirement: Paragraph 3.17.1 - "The landing gear indicating system for all aircraft shall consist of one indicator, in accordance with Specification No. 21250, for each retractable unit of the landing gear system and one red indicator light, Type AN3157-6."

Deviation: The red indicator light shall not be Type AN3157-6, but shall be of a type suitable for inclusion within the knob of the landing gear control handle, subject to USAF approval.

Reason for Change and Remarks: This is in compliance with Paragraph 6A120c of the HIAD, as revised July 1950. The Contractor believes this later revision should be followed for this item.

* * * *

114	3.16.11.2	Signal Assemblies

Requirement: Paragraph 3.19 - "An indicator light, AN3157-6, as shown on Figure 9, shall be installed near the cabin pressure altimeter to warn the pilot that the cabin pressure had decreased. A cut-off switch, AN3021-8, shall be located near the indicator light."

Deviation: Cabin pressure warning shall not be installed.

Reason for Change and Remarks: Information received from WADC, in connection with another USAF contract, indicates that cabin pressure warning is no longer desired.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph USAF Specification No. 32300-E (Cont)

110 Reason for Change and Remarks: 1 and 3 - The duration of operation and the complexity of the airplane makes provisions for reading voltage unnecessary and undesirable. 2 - Space limitations make it desirable to locate the ammeter on the sub-panel.

* * * *

111 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.8 - "A sub-base in accordance with AN-3204-2 for mounting the voltage regulator, shall be installed in a horizontal position when the airplane is in a normal flight attitude.

Deviation: No regulator sub-base shall be installed.

Reason for Change and Remarks: Regulator is included as a part of the MCREXE22-89A control panel.

* * * *

112 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.9.3 - "The reverse current relay shall be remotely controlled as shown on Figures 2, 3 and 4 and the controls shall be installed on the pilot's or engineer's electrical switch panel.

Deviation: The requirement of the above paragraph shall not apply.

Reason for Change and Remarks: The functions of the reverse current relay are included in the control panel, Exhibit MCREXE22-89A.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
115	3.16.3.1 3.16.3.2	Instrument Power Electronic Equipment Power

Requirement: Paragraph 3.20.1 - "When inverter-powered equipment, such as Type B electronic turbo regulators and electric flight instruments, are essential to maintain flight, a spare inverter shall be provided. The spare inverter may also be used as an operative spare to supply power to equipment which is not essential to maintain flight."

Paragraph 3.20.2 - "When continuation of alternating current power is essential to operation of equipment, an automatic change-over control shall be used with the spare inverter."

Deviation: Inverters shall be installed for standby operation only in the event of failure of the airplane alternating current generator or the MX-1179 power unit. Automatic change-over shall not be required.

Reason for Change and Remarks: The alternating current power will be obtained from the alternating current generator whose frequency will be regulated within customary requirements. The automatic change-over feature on inverters has been found to be unnecessary. Reference AIA Report ATC No. 51-47, dated 19 September 1951.

* * * *

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
116	3.16.10.1	External Power

Requirement: Paragraph 3.21.1 - "On jet-type aircraft the receptacles shall be located so that maintenance personnel will not be required to pass within the dangerous area surrounding the air inlet or tailpipe of the engine."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)

116 **Deviation:** The external power receptacles may be located at any convenient place accessible from the ground.

Reason for Change and Remarks: Since the airplane can only be started from the GTC no danger exists from the engine inlet or tailpipe. At this time airplane power will be supplied by the GTC and the external plugs will not be connected to the airplane.

* * * *

117 3.16.10.1 External Power

Requirement: Paragraph 3.21.2 - "The receptacles shall not be installed in a location which will require the external power supply cable to pass through the bomb bay doors or wheel well."

Deviation: The external power receptacles may be installed in the wheel well.

Reason for Change and Remarks: Since the external power receptacles will be used for ground test only, and since weight can be saved and unnecessary complications eliminated by installing the receptacles in the wheel wells, the Contractor should be given greater latitude in locating these units

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118 3.16.10.1 External Power

Requirement: Paragraph 3.21.3 - "A spring-loaded hinged access door shall be installed over the external power receptacle so that the door opens against the slip stream. When re-

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
118	Requirement (Cont)	

quired, a suitable box or protection shall be provided around the receptacle to prevent accidental short circuiting."

Deviation: A door shall be required only if the receptacles are installed in the outside skin of the airplane. Protection shall be provided against accidental short circuiting.

Reason for Change and Remarks: The receptacles may be installed in the wheel well, as covered by the above deviation, in which case a door will not be required.

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119 3.16.2.2 Alternating Current

Requirement: Paragraph 3.21.7 - "The variable frequency alternating current external power receptacle shall be connected in accordance with the circuit shown on Figure 1."

Deviation: The alternating current receptacle shall be connected substantially as shown on Figure 1 of Exhibit WCEEE-1-12.

Reason for Change and Remarks: USAF has requested the use of the alternating current control panel described by Exhibit WCEEE-1-12.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
120	3.16.4	Equipment - Installation

Requirement: Paragraph 3.22.1 - "All relays shall conform to Specification No. AN R-20 and shall be subject to approval of the specific application by the Procuring Agency. Non-standard open contact relays shall not be used."

Deviation: Special relays, as approved by USAF, may be used where required. Approval of circuit diagrams calling for these relays shall constitute USAF approval for the use of these relays.

Reason for Change and Remarks: Due to complexity of design, it will be necessary in some cases to use special relays.

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Deviation	Paragraph	
121	3.16.11.4	Meters

Requirement: Paragraph 3.25.2 - "A direct current voltmeter, in accordance with Specification No. AN-S-19, shall be installed as shown on Figure 14."

Deviation: A direct current voltmeter shall not be required.

Reason for Change and Remarks: USAF request made at cockpit conference.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
122	3.16.11.3 3.16.11.4	Warning Lights Meters

Requirement: Paragraph 3.25.3 - "Meters shall be located on the pilot's or engineer's instrument panel and shall be grouped together and in close proximity to the generator control switch, the voltage control rheostat, and the generator failure indicating lights."

Deviation:

(a) Meters need not be located in close proximity to the generator controls.

(b) The generator failure indicating light shall be located on the instrument sub-panel above the main instrument panel.

Reason for Change and Remarks: (a) Congestion in the cockpit and the requirement for giving preference to the MX-1179 controls makes compliance impossible. (b) USAF request made at cockpit conference.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40149, dated 2 September 1947, Check List; Air Crew Operation
123	3.19.2.5	Check List

Requirement: Paragraph E-1b(2)a - "The material with which the content is printed on the plate shall be a phosphorescent substance having a peak brightness of at least 100 microlamberts when measured in accordance with provisions of Specification No. AN-L-1. It shall have a phosphorescent value of at least 15 percent of its peak brightness 30 seconds after removal from the source of excitation and at least 3 percent of its peak brightness 2 minutes after its removal from the source of excitation."

Deviation: The check-off list shall be illuminated according to Specification No. AN-P-89.

Reason for Change and Remarks: For uniformity and ease of servicing all lighting in the cockpit is red light. There is no ultraviolet light provision in the cockpit.

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C, dated 15 December 1947, Anti-Icing Equipment for Aircraft (Heated Surface Type), General Specification for
124	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-1e. - "Antenna masts, pitot tubes, radar vanes and airfoils, and other structures of similar nature which project into the air stream so as to be exposed to and adversely affected by ice accumulations shall be protected by the anti-icing system."

Deviation: Applicable, except that the radome will be protected by a freezing point suppressant liquid spray.

Reason for Change and Remarks: Freezing point suppressant liquid spray system recommended by WADC Components System Laboratory.

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Deviation	Paragraph	
125	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-2a. - "The anti-icing system shall provide protection against an icing condition ...., and wherein the size of the water droplets is not less than 15 microns in diameter."

Deviation: The anti-icing system shall provide protection against an icing condition ...., and wherein the mean effective cloud droplet diameter is not less than 15 microns.

Reason for Change and Remarks: The accepted method of designing for the protection of aircraft against ice is based on a mean effective cloud droplet diameter rather than a minimum diameter.

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
126	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-3. - "No aircraft structural members shall be heated to more than 200°F."

Deviation: It shall be permissible for aircraft structural members to be heated to more than 200°F.

Reason for Change and Remarks: In some instances aerodynamic heating alone will heat aircraft components in excess of 200°F. Allowance for strength reduction due to high temperatures will be made.

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Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
127	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-5. - "The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than five degrees Fahrenheit after two hours of operation."

Deviation: The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than 5°F during the length of time that the anti-icing system may be in operation.

Reason for Change and Remarks: The flight time under icing conditions will be much less than two hours.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
128	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-8a. - "The anti-icing system shall be capable of distributing heat to remove frost and ice from the wing and empennage surfaces when the airplane is at rest on the ground at all ambient temperatures down to -65°F."

Deviation: When the airplane is at rest on the ground the anti-icing system shall be capable of distributing heat to remove frost and ice from the wing and empennage surfaces which are anti-iced during flight.

Reason for Change and Remarks: In clarification of requirements.

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Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
129	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-9. - "The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, dated 9 January 1946."

Deviation: The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, dated 9 January 1946, or other authoritative literature.

Reason for Change and Remarks: There is authoritative literature which is more up to date and more realistic with respect to predicting water catch, water load profiles, and heat requirements.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40935-C (Cont)
130	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraphs F-5 through F-5b. - Conditions for Testing:

Deviation: The performance of the porous stainless steel anti-icing system used on the wing and tail shall be determined by emperical tests and the analytical performance prediction methods shall be established on the basis of these laboratory data. At that point of development an applicable flight test program representative of actual operating conditions of the airplane may then be jointly determined by WADC and the Contractor.

Reason for Change and Remarks: The thermodynamic mechanism of the porous stainless steel skin system is entirely different from conventional nonporous skin systems so that conventional methods of analysis and test are not applicable.

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-5072, dated 6 April 1949- Instrument Systems; Pitot Static Tube Operated, Installation of
131	3.14.3	Installation - Instruments

Requirement: Paragraph 3.3.6 - "The pitot and static pressure lines connecting the pitot and static tubes to the instruments shall conform to Specification No. WW-T-787, ..."

Deviation: The pitot and static lines shall conform to Specification No. WW-T-787 where advisable.

Reason for Change and Remarks: To permit installation of suitable non-metalic lines in radome area.

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Deviation	Paragraph	
132	3.14.3	Installation - Instruments

Requirement: Paragraph 3.3.15 - "When specified, an alternate source of static pressure for each pitot-static tube shall be provided by installing a static pressure selector valve conforming to Drawing AN5831, ..."

Deviation: An alternate source of static pressure shall not be required.

Reason for Change and Remarks: It is anticipated that special means with respect to static sources will have to be taken to meet the requirements for instrumentation and MX-1179 equipment. The Contractor proposes to satisfy these particular requirements.

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SECRET
SECURITY INFORMATION

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-5072 (Cont)
133	3.14.3	Installation - Instruments

Requirements: Paragraph 4.3.3.4.3 - "The air speed and altitude indication errors due to the location of the pitot-static tube, corrected to standard sea level conditions, shall not exceed the limits specified in Table I when tested in flight."

Deviation: In the transonic and supersonic speeds the Contractor will attempt to obtain the maximum accuracy possible using latest techniques.

Reason for Change and Remarks: The available equipment is not expected to yield the specified accuracies at transonic speeds.

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-W-5088, dated 14 March 1951 - Wiring; Aircraft, Installation of
134	3.16.5	Wiring

Requirement: Paragraph 3.5.1.3 - "In areas where the cable temperature exceeds 100°C (212°F), cables specifically approved for high temperature use shall be installed."

Deviation: Where a temperature of 100°C (212°F) is exceeded only during high speed operation, high temperature wire shall not be required.

Reason for Change and Remarks: Short duration of high temperature operation does not warrant the additional weight and cost. High temperature wire will be used wherever there is any possibility of damage to excessive temperature.

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135	3.16.10.2	Electrical Connectors

Requirement: Paragraph 3.6.6.4 - "Connectors for general aircraft wiring shall be in accordance with Specification No. MIL-C-5015."

Deviation: A minimum number of nonapproved type connectors may be used where necessary, subject to the approval of the procuring agency. Approval of circuit diagrams calling for these connectors shall constitute such approval.

Reason for Change and Remarks: This will permit the Contractor to make the best possible design from the servicing standpoint.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-W-5088 (Cont)

136 3.16.5 Wiring

Requirement: Paragraph 3.7.3 - "Cable groups shall contain no more than 26 cables, except as provided in Paragraph 3.7.3.2."

Deviation: It shall be permissible to install cable groups with more than 26 cables, provided, however, that such cable groups shall be kept to a minimum and shall be used only where such cable groups are required to go through congested areas.

Reason for Change and Remarks: The size of the airplane and the large number of cables required make it impossible to meet this requirement in all cases.

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137 3.16.5 Wiring

Requirement: Paragraph 3.11.1.2 - "Master diagrams shall be substantially in accordance with Drawing No. 45L6937, and may be on multiple sheets or in book form in accordance with Specification No. MIL-H-5473."

Deviation: Master diagrams shall be on individual sheets in accordance with Specification No. MIL-H-5473, except that no internal diagrams shall be required.

Reason for Change and Remarks: Internal diagrams will be included on the schematics and to include them on the circuit diagrams would be a duplication adding unnecessary work.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-H-5440, dated 9 June 1950 - Hydraulic Systems; Design, Installation and Test of Aircraft
138	3.15.1	Hydraulic System

Requirement: Paragraph 3.5.4 - "Disengagement and By-Passing - Provisions shall be made in the design of power-boosted and power-operated surface control systems for disengaging the actuator in the event of failure or jamming of the actuator, control valve or connecting linkages. Provisions need not be made for re-engaging in flight. Provisions shall be made for automatically by-passing, where necessary, the fluid from one side of the actuator to the other in the event of a power system failure. In addition, provisions shall also be made for temporarily by-passing the fluid from one side of the actuator to the other during periods when it is desired to operate surface controls manually with the hydraulic pressure turned off and the actuator disengaged."

Deviation: Disengagement and by-passing will not be required.

Reason for Change and Remarks: This is not considered applicable to a full-power control system.

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Deviation	Paragraph	
139	3.15.1	Hydraulic System

Requirement: Paragraph 3.8.10 - "Male-threaded aluminum alloy fittings shall not be used with stainless steel lines in sizes below -8 size."

Deviation: The -6 size male fittings may be aluminum alloy.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-H-5440 (Cont)

139 Reason for Change and Remarks:

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140 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.14 - "Gages - Pressure gages in accordance with the applicable specifications listed in Section 2 shall be provided to indicate the system pressure in the hydraulic system or subsystems where necessary."

Deviation: Remote reading hydraulic gages may be used.

Reason for Change and Remarks: Remote reading gages are considered desirsble to prevent routing of high pressure hydraulic lines within the cockpit area.

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141 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.25.4 - "Normal ground-servicing, fluid-level range shall be indicated with the accumulator or accumulators completely discharged of oil pressure and another level range to indicate the safe operating limit with accumulators charged to normal air and oil pressure."

Deviation: Indication of fluid level range, with accumulators filled with oil, is not required.

Reason for Change and Remarks: It is not practical to fill the reservoir with the system in operation and accumulators filled with oil.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-H-5440 (Cont)
142	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.25.5 - "The reservoir pressure shall be controlled by an external, nonadjustable pressure regulating device set to 12 psig (26.7 psia) which shall be connected to the air space above the oil level in the reservoir to protect the reservoir from rupturing ...."

Deviation: Pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of hydraulic pumps.

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Deviation	Paragraph	Military Specification No. MIL-H-5440 (Cont)
143	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.29.3 - "The pressure drop from the reservoir to the pump intake port .... shall be such that the pressure at the inlet port will not be less than 14 inches of mercury absolute nor more than 12 psig (26.7 psia)."

Deviation: Applicable, except as modified in deviation to Paragraph 3.8.25.5 of MIL-H-5440.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-H-5440 (Cont)
144	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.31.1 - "Material - Tubing shall be either corrosion-resistant steel, 52S-O aluminum alloy or 61S-T aluminum alloy conforming to the applicable specifications and drawings listed in Section 2. Other tubing may be used provided it is specifically approved."

Deviation: Applicable, except that corrosion-resistant steel tubing, conforming to Specification No. AMS-5566a, may be used.

Reason for Change and Remarks: Tubing per MIL-T-6845 is difficult to procure.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5514A, dated 7 June 1950 - Packings; Installation and Gland Design of Aircraft Hydraulic and Pneumatic (General Specification for)
145	3.15.1.1	Hydraulic System - Description and Components

Requirement: Paragraph 1.1 - "This specification is drawn to establish basic design criteria covering use and application of packings, packing glands, and related features as used in hydraulic system equipment in accordance with Specification No. MIL-H-5440, using MIL-O-5606 hydraulic fluid, and in pneumatic system applications, in accordance with Specification No. MIL-P-5518."

Deviation: Applicable, except that special seals may be required for local high temperature conditions. Such special seals shall be submitted to WADC for approval.

Reason for Change and Remarks: The seals of Specification No. MIL-P-5514 are not suitable for high temperature use.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518, dated 3 January 1950 - Pneumatic Systems; Design, Installation and Test of Aircraft
146	3.15.2	Pneumatic System
	Requirement:	Paragraph E-5a - "Tubing shall be either corrosion-resistant steel conforming to Drawing AND10104, or aluminum alloy conforming to Drawing AND10106. Other tubing may be used provided it is specifically approved by the Procuring Agency."
	Deviation:	Applicable, except that corrosion-resistant steel tubing, conforming to Specification No. AMS-5566a, may be used.

Reason for Change and Remarks: Tubing per MIL-T-6845 is difficult to procure.

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Deviation	Paragraph	
147	3.15.2	Pneumatic System
	Requirement:	Paragraph E-13a(1) - "The ground charging connection shall be installed in accordance with Drawing AND10071 . . . ."
	Deviation:	Applicable, except that AND10071 valve installation may be replaced by a valve permitting greater air flow.

Reason for Change and Remarks: To reduce ground charging time.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518 (Cont)
148	3.15.2	Pneumatic System

Requirement: Paragraph E-22a(1) - "The use of all packings shall be as specified in Specification No. AN-P-74."

Deviation: Applicable, except that in special cases where friction forces are detrimental, other types of packings may be used subject to WADC approval.

Reason for Change and Remarks: Friction may be critical in certain valves.

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Deviation	Paragraph	
149	3.15.2	Pneumatic System

Requirement: Paragraph E-25a - "Pressure gages AN5769 or AN5771, in accordance with Specification No. AN-G-2, shall be provided ...."

Deviation: Applicable, except that remote reading indicators may be used.

Reason for Change and Remarks: It is not practical to fill the reservoir with the system in operation and accumulators filled with oil.

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-R-5520, dated 3 January 1950 - Reservoirs; Hydraulic
150	3.15.1	Hydraulic System

Requirement: Paragraph E-1i(2) - "Where pressurized reservoirs are used, means shall be provided to limit internal pressures to a maximum of 12 pounds per square inch gage."

Deviation: Applicable, except that the pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps.

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SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-5842(USAF), dated 1 September 1950 - Transparent Areas; Anti-Icing, Defrosting and Defogging Systems, General Specification for
151	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.2.2.1 - "The windshield shall be defined as the transparent area or areas which are intercepted by a line through the eyepoint of the pilot (or copilot) in the forward and forward oblique direction (approximately 45 degrees to either side of straight ahead) and which are normally used in flying and landing the aircraft."

Deviation: The windshield shall be defined as the flat glass area in the center.

Reason for Change and Remarks: It is planned to use an electrically-conductive coating for anti-icing which can be used only on flat glass.

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Deviation	Paragraph	
152	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.6 - "A clear vision panel (one which is openable in flight under conditions of ice, frost and fog), or a section of transparent area maintained in a clear condition under conditions of ice, frost, and fog, shall provide vision to the pilot in the event of failure of the normal defroster, defogging, or anti-icing system or systems."

Deviation: Emergency vision as defined in Paragraphs 3.6, 3.6.1 and 3.6.2 of Specification No. MIL-T-5842 will not be provided.

Reason for Change and Remarks: An operable panel is not considered practicable from the standpoint of clearance required and obstruction to pilot's vision due to framework required. The only space available for an additional clear transparent area is on the curved glass panels where electrically-conductive coatings cannot be used.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	
153		Deleted.
154		Deleted.

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	
155		Deleted.
156		Deleted.

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-I-5997(USAF), dated 31 January 1951, Instruments and Instrument Panels, Aircraft, Installation of
157	3.14.3	Installation - Instruments

Requirement: Paragraph 3.2.4 - "The vibration absorbers shall be mounted with their mounting surfaces horizontal when the airplane is in normal flight attitude. They shall be so located that the vertical axes of all vibration absorbers are in a single vertical plane parallel to the instrument panel. This plane shall pass through the center of gravity of the instrument panel complete with the instruments, as shown on Figure 1. The vibration absorbers shall also be located as nearly as possible equidistant from the center of gravity of the completely-assembled instrument panel."

Deviation: The upper two absorbers shall be converted into stabilizers, and the lower two shall take the full panel load.

Reason for Change and Remarks: The vibration absorbers are located in an area critical for vision. To comply with Specification No. MIL-I-5997 would seriously encroach on landing visibility.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053, dated 1 June 1950 - Tests; Landing Gear Shock Absorber Drop
158	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-7 - "The assembly of the shock absorber, wheel and tire shall be dropped freely and shall develop a vertical velocity of 12 feet per second upon ground contact. The necessary drop height is normally taken as 27 inches which shall be measured vertically from the position of the assembly when the tire is just contacting the ground or platform."

Deviation: The assembly of the shock absorber, wheel and tire shall be dropped freely and shall obtain the following contact velocity: (1) A contact velocity of 9 feet per second with 1W wing lift shall not exceed the established limit load factor at design landing weight. (2) A contact velocity of 12 feet per second with 1W wing lift at design landing weight shall not fail the shock strut structure. (3) A contact velocity of 5 feet per second shall be used to establish the limit load factor at design take-off weight. The 1W wing lift shall be considered in effect. The effective weight (W_e) must be correct for the velocity used. This test may be run in conjunction with the overload test specified in Paragraph F-15.

Reason for Change and Remarks: (1) To establish the limit load factor at the design landing weight. (2) This test is to substantiate that the strut has sufficient energy absorption capacity for an extremely hard landing at design landing weight. (3) This test is to substantiate that the strut has sufficient energy absorption capacity for an extremely hard landing at design take-off weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
159	3.8.2.4 3.8.4.4	Shock Absorbers - Main Landing Gear Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-8 - "Nose Wheel Type Airplane - The main landing gear and the auxiliary landing gear shall be dropped on a platform inclined at 18 degrees and 16 minutes to the horizontal, to provide an aft component of load on the landing gear."

Deviation: The main landing gear and the auxiliary landing gear shall be dropped on a horizontal surface. The wheel shall be spun in the reverse direction when dropping on the stationary surface at a velocity corresponding to design landing speed. The rolling radius of the tire shall be considered to be moving at this velocity. The surface upon which the landing gear is dropped may be commercial finish steel plate, or equivalent. The moment of inertia of the rotating parts of the brakes shall be simulated for the drop test.

Reason for Change and Remarks: To simulate actual airplane conditions and to establish test conditions. Use of rolling radius requested by WADC letter WCSWF/NMR/nlt dated 16 October 1951.

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Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
160	3.8.2.4 3.8.4.4	Shock Absorbers - Main Landing Gear Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-10 - "The total droppable weight in the jig is named the 'effective weight' and shall be determined by the following formula:

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
160 (Cont)	Requirements	(Cont)

$$W_e = \frac{27W}{d + 27}$$

W_e = effective weight

W = 1/2 the stress analysis gross weight of the airplane for the main landing gear, or the static weight on the auxiliary gear.

d = The pneumatic throw on the tire plus full vertical axle travel. The pneumatic throw of the tire is the deflection of the specific tire under a dynamic load of (0.9N-1)W pounds. The value of "d" will normally be determined from tire load deflection curves furnished by tire manufacturers or the Procuring Agency. The pressure in the tires shall be that required for proper inflation on the airplane with gross weight W. For main and tail tires, the tire pressure shall be that required for the static reaction on the tires with the airplane in the 3-point position. For the nose wheel, the tire pressure shall be that computed by the method given in Section II, Part V, Paragraph 73 of the Handbook of Instructions for Airplane Designers."

Deviation: Effective Weight - When separate means for supplying the 1W wing lift is provided, the total droppable weight in the jig shall be Wd. When separate means for supplying the 1W wing lift are not provided, the total droppable weight in the jig shall be reduced to an effective weight as determined by the following formula:

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
160 (Cont)	Deviation (Cont)	

$$W_e = \frac{h\, W_d}{d + h'}$$

$$h' = \text{jig drop height} = \frac{(\text{contact velocity} - \Delta V)^2}{2g}$$

where:

ΔV = Area under acceleration vs time curve acceleration = (L. F. -1)g between time of contact and time of load factor equals one.

W_e = Effective Weight - This value must be checked after a drop of "h" inches to insure that it is within 3% of the calculated value and corrected if necessary.

W_d = One-half the design landing weight for the main gear or the static weight on the nose gear.

d = The pneumatic throw of the tire plus the estimated vertical axle travel. The pneumatic throw of the tire is the deflection of the specific tire under a dynamic load of Ng W pounds. The value of the pneumatic tire throw will be determined from tire load deflection curves furnished by the tire manufacturers or the Procuring Agency. The pressure in the tires and shock struts shall be that required for proper inflation on the airplane under maximum take-off gross weight. For the main gear tire, the tire pressure shall be that required for the static reaction with the airplane in the three-point posi-

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
160 (Cont)	Deviation (Cont)	tion. The tire pressure for the nose wheel shall be that computed by the method given in Section 7 of the Handbook of Instructions for Airplane Designers.

Reason for Change and Remarks: This deviation is required in order to be consistent with other deviations listed herein (Items 1 and 2).

* * * *

161 3.8.2.4 Shock Absorbers - Main Landing Gear
3.8.4.4 Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-10a - "A drop of 18 inches shall be made prior to making any test records. This is not necessary if the mass in the jig is tied to the basket."

Deviation: A drop of 12 inches shall be made prior to making any test records.

Reason for Change and Remarks: To be consistent with deviations listed herein (Items 1 and 2).

* * * *

162 3.8.2.4 Shock Absorbers - Main Landing Gear
3.8.4.4 Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-11 - "The maximum allowable load factor developed in the drop test shall not exceed the value given in the following formula:

$$N_j = \frac{(0.9N-1)W}{W_e}$$

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
162 (Cont)	Requirement (Cont)	

N_j = jig load factor = acceleration $(\frac{dv}{dt})$ in g's recorded in the jig + 1.

W = 1/2 design gross weight of the airplane for the main landing gear or static weight on the auxiliary gear.

N = ultimate ground load factor as determined from the Procuring Agency's applicable specification.

W_e = effective weight

Deviation: When separate means for supplying the 1W wing lift are provided, the maximum allowable load factor developed in the drop test shall not exceed N_g.

$$N_j = N_g$$

When separate means for supplying the 1W wing lift are not provided, the maximum allowable load factor developed in the drop test shall not exceed the value given in the following formula:

$$N_j = \frac{N_g W_d}{W_e}$$

N_j = jig load factor = acceleration $(\frac{dv}{dt})$ in g's recorded in the jig + 1.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)

162 (Cont) Deviation (Cont)

W_d = 1/2 design landing weight for the main gear or the static weight on the nose gear.

N_g = $n_a - 1$.

n_a = airplane limit landing load factor.

W_e = effective weight.

Reason for Change and Remarks: To be consistent with application of 1W wing lift as specified in other deviation listed herein (Item 1).

* * * *

163 3.8.2.4 Shock Absorbers - Main Landing Gear
3.8.4.4 Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-14 - "Records shall be taken as direct readings from the test rig and shall be taken at intervals of three inches up to and including the maximum drop height of 27 inches."

Deviation: Direct Reading Records - Records shall be taken as direct readings from the test rig and shall be taken at intervals of three inches up to and including the drop height specified in Paragraph F-7, Item 1.

Reason for Change and Remarks: To be consistent with deviation listed in Item 1.

* * * *

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423(USAF)(2), dated 12 September 1951 - Lighting Equipment; Aircraft Instrument Panel, General Specification for Installation of
164	3.16.8.2	Interior Lighting

Requirement: Paragraph 3.2.3.4 - "...., the light assemblies shall be grouped on intensity controls in such a manner as to permit the pilot and copilot to control the light intensity of his flight instrument group separately from that of his engine instrument group."

Deviation: Only one rheostat shall be required for the control of all instrument lighting, with the exception of the standby compass.

Reason for Change and Remarks: The configuration of the panel and the space limitations of the cockpit do not lend themselves to the use of separate rheostats as specified.

* * * *

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503(USAF), dated 5 July 1951 - Lighting Equipment; Aircraft, General Specification for Installation of
165	3.16.11.3	Warning Lights

Requirement: Paragraph 3.2.2.8.1 - "Warning lights shall be red non-dimming small jewel in accordance with Drawing AN3157 and shall be provided in connection with systems over which operating personnel have no control and gives a warning of trouble not caused by personnel action and indicates immediate action required to prevent immediate loss of aircraft."

Deviation: Warning lights shall be as agreed at the time of the mock-up.

Reason for Change and Remarks: The configuration of the cockpit and the mission of the airplane necessitates the integration of the entire cockpit for maximum utility and the warning system particularly will be of nonstandard configuration.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6730, dated 9 June 1950 - Lighting Equipment; Exterior, Installation of Aircraft (General Specification)
166	3.16.8.3	Exterior Lights

Requirement: Paragraph C-2 - "When applicable, aircraft exterior lighting systems shall contain the light assemblies shown in Table III."

Paragraph D-3b - "Both top and bottom fuselage lights shall be equipped with clear white glass covers as specified in Table III."

Deviation: Special lights may be installed as required and as approved by the USAF.

Reason for Change and Remarks: Aerodynamic design considerations and the configuration of the wing and tail dictate the use of special exterior lights.

* * * *

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-C-6822(1), dated 6 October 1950 - Clamp; Mounting, 2-Inch Size Instrument, Installation of
167	3.14.3	Instrument Installation
	Requirement:	Figure 1 - Specifies that clamps are to be mounted 45° from vertical.
	Deviation:	Clamps shall be installed to obtain maximum density of instruments within the panel.

Reason for Change and Remarks: Space in the panel is very limited and high density instrument spacing is imperative to maintain good vision over the panel.

* * * *

SECRET
SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080, dated 27 December 1950 - Electrical Equipment; Installation of Aircraft; General Specification
168	3.16.4	Equipment - Installation

Requirement: Paragraph 3.1.5(j) - "Ventilation: Adequate ventilation shall be provided. An operating temperature range of -55°C (-67°F) to +70°C (+158°F) has been established as the goal to which the design and manufacture of electrical equipment must be directed. It is required that electrical equipment be installed in such manner that these temperature ranges will not be exceeded under normal operating conditions of the aircraft unless otherwise specified."

Deviation: Temperatures in excess of the limits specified shall be permissible under high speed flight conditions, provided that it is demonstrated that the temperature is of such short duration and of such a value that the equipment shall not be damaged.

Reason for Change and Remarks: The short duration of excess temperature makes damage to equipment extremely unlikely and the weight and compromise of design required to keep the temperature within the specified limits is not warranted.

* * * *

Deviation	Paragraph	
169	3.16.4	Equipment - Installation

Requirement: Paragraph 3.3.1 - "Types. - Circuit breakers shall conform to Specification MIL-C-7079. Circuit breakers above 50 ampere capacity and those required for AC circuits shall be approved by the Procuring Service. ...."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
169	Deviation:	Circuit breakers shall conform to Specification No. MIL-C-5809 or shall be a substitute trip-free breaker approved by the USAF. These breakers shall also be used for protection of alternating current circuits.

Reason for Change and Remarks: Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF models.

* * * *

170	3.16.4	Equipment - Installation
	Requirement:	Paragraph 3.3.2.1 - "Push-pull circuit breakers shall conform to drawing AN3161 and shall be used for circuit protection and emergency contro."
		Paragraph 3.3.2.2 - "Switch circuit breakers shall conform to Drawing AN3160, ..."
	Deviation:	Push-pull breakers shall conform to drawings MS25005 and MS25006, switch breakers shall conform to drawings MS25003 and MS25004 or shall be a substitute trip-free breaker approved by USAF.

Reason for Change and Remarks: Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF models.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
171	3.16.13	Relays

Requirement: Paragraph 3.6.1 - "Relays shall conform to Specification MIL-R-6106 and the applicable AN drawings."

Deviation: As required, relays may be of a design not covered by AN drawings subject to the approval of the Procuring Agency. Approval of an individual circuit using nonstandard relays shall constitute approval of the Procuring Agency.

Reason for Change and Remarks: Special problems on this airplane requires the use of nonstandard relays.

* * * *

Deviation	Paragraph	
172	3.16.4	Equipment - Installation

Requirement: Paragraph 3.8.1 - "Rheostats shall conform to Specification MIL-R-6749, and are available in various standard capacities as shown on drawing AN3155."

Deviation: It shall be permissible to use rheostats in accordance with JAN-R-19 and JAN-R-22.

Reason for Change and Remarks: These rheostats are approved and can be obtained in smaller dimensions than the AN3155 rheostats, thereby conserving space in the cockpit.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
173	3.16.2.1 3.16.2.2	Direct Current Power Supply Alternating Current Power Supply

Requirement: Paragraph 3.11.5 - "The installation of remote-driven generators and their drives shall be contingent upon the Procuring Service's approval."

Deviation: The generators shall be remote driven by the cooling air turbine motor.

Reason for Change and Remarks: The number of generators to be driven and the saving in weight make this installation desirable.

* * * *

APPENDIX III

APPENDIX III-D

NEW AND NOVEL FEATURES

1. The 60 degree delta wing configuration of the proposed design provides superior aerodynamic and structural characteristics for solution of the USAF interception problems of local air defense, general air defense and free-lance defense operation.

2. The wing and tail leading edges and the engine air intake duct lips shall be anti-iced by means of heated air which escapes through porous metal skin on the above surfaces.

[redacted]

UNCLASSIFIED

MODEL SPECIFICATION

FOR

CONVAIR MODEL 8

UNITED STATES AIR FORCE MODELS YF-102 AND F-102A

INTERCEPTOR FIGHTER AIRPLANE

CONTRACT AF33(600)-5942

* * * * *

REPORT NO. ZD-8-001
DATED 1 MARCH 1952

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REVISED 1 DECEMBER 1952

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SUPERSEDES ZD-041
DATED 29 DECEMBER 1950

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Classification Changed to:
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1533-2 1-27-69

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By O. C. Priest
Specification Section

Approved J. M. Hemphill
Project Engineer

Checked W. H. Brown
Specification Section

Approved
Chief Engineer

[redacted]

UNCLASSIFIED

[redacted]

LIST OF INCORPORATED CHANGES

The following RFA's (Request for Alteration), Categories I, II and IV, as approved by the USAF Mock-Up Inspection Board, 13 Nov thru 21 Nov 1952, have been incorporated in this specification:

RFA No.	Paragraph Affected
2	None
5	3.11.5 rev'd
11	None
12	None
14	None
17	None
18	3.22.2 - Dev 89a Added
19	None
20	3.7.1.3.4 rev'd
21	3.7.1.6 rev'd
22	3.13.1(c) deleted
23	3.12.8.1 rev'd
24	None
26	3.12.9.11 deleted - Dev 153 thru 156 deleted - Item 3 of Appendix III-C deleted
27	3.11.5 rev'd
29	None
30	3.12.9.6 rev'd
31	None
34	3.13.1(b) deleted
37	3.17.2.6 rev'd
43	None
44	None
45	None
46	None
52	None
55	3.17.20 added
56	3.16.2.1 rev'd
57	3.16.2.1 rev'd
58	None
59	3.16.2.1 rev'd - Appendix 1-C, Page 73 - Item 26 changed
60	3.16.2.2 rev'd - Appendix 1-C, Page 73 - Item 28 Changed
61	Appendix 1-C, Page 72, Item 3 chg
62	3.16.2.1 rev'd 3.16.2.2 rev'd
63	None
64	None
71	None
72	None
79	None
84	None
86	None
89	None
91	None
92	3.16.11.3 rev'd
94	None
96	None
97	None
99	None
100	None
103	None
104	None
106	3.16.11.1 rev'd
107	None
111	None
115	None
116	None
119	None

[redacted]

TABLE OF CONTENTS

1. SCOPE AND CLASSIFICATION 1

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS 1

3. REQUIREMENTS 2

3.1 CHARACTERISTICS 2
3.1.1 THREE VIEW DRAWINGS 2
3.1.2 PERFORMANCE 4
3.1.3 WEIGHTS 4
3.1.4 CENTER OF GRAVITY LOCATIONS 10
3.1.5 AREAS 12
3.1.6 DIMENSIONS AND GENERAL DATA 12
3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS 14
3.2 GENERAL 14
3.2.1 GENERAL INTERIOR ARRANGEMENT 14
3.2.2 MATERIALS 15
3.2.3 WORKMANSHIP 15
3.2.4 PRODUCTION, MAINTENANCE AND REPAIR 15
3.2.5 INTERCHANGEABILITY & REPLACEABILITY . . . 15
3.2.6 FINISH 15
3.2.7 IDENTIFICATION AND MARKING 15
3.2.8 EXTREME TEMPERATURE OPERATION 16
3.2.9 CLIMATIC REQUIREMENTS 16
3.2.10 LUBRICATION 16
3.2.11 STANDARD PARTS 16
3.2.12 CREW. 16
3.2.13 EQUIPMENT INSTALLATION 16
3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION . . 17

3.3 AERODYNAMICS 18
3.3.1 GENERAL 18
3.3.2 STABILITY AND CONTROL 18

[redacted]

TABLE OF CONTENTS

3.4 STRUCTURAL DESIGN CRITERIA 19
3.4.1 LIMIT FLIGHT LOAD FACTORS 19
3.4.2 LIMIT GROUND LOAD FACTORS 19
3.4.3 LIMIT DIVING SPEED 19
3.5 WING GROUP 21
3.5.1 DESCRIPTION AND COMPONENTS 21
3.5.2 CONSTRUCTION 21
3.5.3 ELEVONS 21
3.5.4 LIFT AND DRAG INCREASING DEVICES 21

3.6 TAIL GROUP 22
3.6.1 DESCRIPTION AND COMPONENTS 22
3.6.2 STABILIZER 22
3.6.3 ELEVATOR. 22
3.6.4 FIN 22
3.6.5 RUDDER 22

3.7 BODY GROUP 23
3.7.1 FUSELAGE 23
3.7.2 HULL 24

3.8 ALIGHTING GEAR 25
3.8.1 GENERAL DESCRIPTION AND COMPONENTS . . . 25
3.8.2 MAIN LANDING GEAR 25
3.8.3 AUXILIARY LANDING GEAR (Tail Wheel) 26
3.8.4 AUXILIARY LANDING GEAR (Nose Wheel) 26

3.9 ALIGHTING GEAR (Water Type) 27

3.10 SURFACE CONTROL SYSTEM 28
3.10.1 PRIMARY FLIGHT CONTROL SYSTEM. 28
3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS 28
3.10.3 TRIM CONTROL SYSTEMS 28
3.10.4 AUTOMATIC FLIGHT CONTROL INSTALLATION . . 28

[redacted]

TABLE OF CONTENTS

3.11 ENGINE SECTION 30
3.11.1 DESCRIPTION AND COMPONENTS 30
3.11.2 CONSTRUCTION 30
3.11.3 ENGINE MOUNTS 30
3.11.4 VIBRATION ISOLATORS 30
3.11.5 FIRE WALLS 30
3.11.6 COWLING AND COWL FLAPS 30
3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE . . . 30

3.12 PROPULSION 31
3.12.1 GENERAL DESCRIPTION AND COMPONENTS 31
3.12.2 MAIN PROPULSION UNIT 31
3.12.3 AUXILIARY PROPULSION UNIT 31
3.12.4 ENGINE-DRIVEN ACCESSORIES 31
3.12.5 AIR INDUCTION SYSTEM 31
3.12.6 EXHAUST SYSTEM 31
3.12.7 COOLING SYSTEM 31
3.12.8 LUBRICATING SYSTEM 32
3.12.9 FUEL SYSTEM 32
3.12.10 WATER INJECTION SYSTEM 34
3.12.11 PROPULSION SYSTEM CONTROLS 34
3.12.12 STARTING SYSTEM 34
3.12.13 PROPELLER 34
3.12.14 ROCKET PROPULSION SYSTEM 34

3.13 AUXILIARY POWER PLANT 35

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT . . . 36
3.14.1 INSTRUMENTS 36
3.14.2 NAVIGATION EQUIPMENT 36
3.14.3 INSTALLATION 36

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS 37
3.15.1 HYDRAULIC SYSTEM 37
3.15.2 PNEUMATIC SYSTEMS 38

[redacted]

TABLE OF CONTENTS

3.16 ELECTRICAL 40
3.16.1 DESCRIPTION 40
3.16.2 ELECTRICAL POWER SUPPLY 40
3.16.3 ELECTRICAL POWER CONVERSION 41
3.16.4 EQUIPMENT INSTALLATION 41
3.16.5 WIRING 41
3.16.6 BONDING 42
3.16.7 CONTROLS 42
3.16.8 LIGHTING 42
3.16.9 IGNITION AND STARTING CONTROL SYSTEM 43
3.16.10 RECEPTACLES 43
3.16.11 INDICATORS 43
3.16.12 ELECTRIC DRIVES 44
3.16.13 RELAYS 45
3.16.14 BOOSTER COIL 45
3.16.15 FILTERS 45
3.16.16 LOAD ANALYSIS 45
3
3.17 ELECTRONICS 46
3.17.1 LIST OF EQUIPMENT 46
3.17.2 COMMUNICATION EQUIPMENT 47
3.17.3 NAVIGATION EQUIPMENT 48
3.17.4 RADAR 50
3.17.5 ELECTRONIC COUNTERMEASURE 50
3.17.6 ELECTRONIC GUIDANCE SYSTEM 51
3.17.7 STATIC DISCHARGERS 51
3.17.8 EMERGENCY RESCUE TRANSMITTER 51
3.17.9 RADOME 51

3.18 ARMAMENT 52
3.18.1 DESCRIPTION 52
3.18.2 FIXED GUNS 52
3.18.3 ROCKETS AND MISSILES 52
3.18.4 FLEXIBLE GUNS 53
3.18.5 STORES 53
3.18.6 PASSIVE DEFENSE 53

[redacted]

TABLE OF CONTENTS

3.19 FURNISHINGS AND EQUIPMENT 54
3.19.1 ACCOMMODATIONS FOR PERSONNEL 54
3.19.2 MISCELLANEOUS EQUIPMENT 54
3.19.3 FURNISHINGS 55
3.19.4 EMERGENCY EQUIPMENT 55
3.19.5 OXYGEN EQUIPMENT 55
3.19.6 EMERGENCY RESCUE EQUIPMENT 55

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT . . . 56
3.20.1 AIR CONDITIONING 56
3.20.2 ANTI-ICING 57

3.21 PHOTOGRAPHIC 59

3.22 AUXILIARY GEAR 60
3.22.1 TOWING PROVISIONS 60
3.22.2 JACKING PROVISIONS 60
3.22.3 MOORING PROVISIONS 60
3.22.4 HOISTING PROVISIONS 60
3.22.5 LEVELING 60
3.22.6 COVERS AND SHIELDS 61
3.22.7 SPECIAL TOOLS 61

4. SAMPLING, INSPECTION AND TEST PROCEDURES . . 62

5. PREPARATION FOR DELIVERY 62

6. NOTES 63

6.1 EXPLANATORY INFORMATION 63
6.2 ADDITIONAL INFORMATION 63
6.3 DEFINITIONS 63
6.3.1 COMPLETE PROVISION FOR 63
6.3.2 STRUCTURAL PROVISIONS FOR 63

[redacted]

TABLE OF CONTENTS

6.3.3 SPACE PROVISIONS FOR 63
6.3.4 OTHER DEFINITIONS 63

APPENDIX 1-A
GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT-CONTRACTOR INSTALLED 64

APPENDIX 1-B
GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT-GOVERNMENT INSTALLED 68

APPENDIX 1-C
CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT-CONTRACTOR INSTALLED 69

APPENDIX II
DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS 77

APPENDIX III-A
INTERCHANGEABILITY LIST 183

APPENDIX III-B
REPLACEABILITY LIST 184

APPENDIX III-D
NEW AND NOVEL FEATURES 185

[redacted]

TABLE OF CONTENTS

Illustrations

Figure 1 General Arrangement - YF-102 Interceptor 3

Figure 2A Performance Summary 6

Figure 2B Limit Dive Speeds vs Altitude 6

Figure 3 Center of Gravity Envelopes 11

Figure 4 Cabin Pressurization Schedule 58

[redacted]

1. SCOPE AND CLASSIFICATION:

1.1 This specification covers the following airplane:

Service Model Designation	YF-102 & F-102A
Consolidated Vultee Aircraft Corporation Model	8
Number and Places for Crew	One pilot
Number and Kind of Engine	One turbo-jet

1.1.1 The primary mission of this airplane is the interception and destruction of attacking enemy aircraft and airborne missiles which fall within the performance capabilities of the aircraft, its armament and the associated electronics equipment under all conditions of weather and visibility and to fulfill the requirements for general, local, and free lance defense operations for aircraft of this type.

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS:

2.1 Applicable specifications listed in the Index of Specifications and Bulletins Approved for Air Force Procurement, dated 1 July 1950, including Supplements through 1 September 1950, shall form a part of this specification.

2.2 The applicable requirements of the following publications with dates as listed below form a part of this specification:

Air Force Specification No. 1800-E, dated 18 May 1944 and Amendment No. 5 dated 28 May 1945.

Handbook of Instructions for Aircraft Designers Ninth Edition, including revisions up to and including 1 April 1950.

Request for Proposal AMC Letter MCREOA-4/WRR/bmm, dated 1 September 1950.

Pratt and Whitney Engine Specification No. A-1647.

Continental Gas Turbine Compressor Specification No. 2051, dated 14 February 1952.

[redacted]

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS (Cont)

Convair Gas Turbine Compressor Modification Specification No. ZK-8-003 as amended by WADC.

Hughes Aircraft Company Specification for the MX-1179 Equipment.

2.3 All other applicable specifications and drawings referenced herein, but not by revision letter, date or amendment, shall be of the issue in effect on 1 September 1950.

3. REQUIREMENTS:

3.1 CHARACTERISTICS:

3.1.1 THREE VIEW DRAWINGS: (See Page 3)

[redacted]

3. REQUIREMENTS (Cont)

3.1.2 PERFORMANCE: For performance requirements see Pages 4, 5, and 6 of SECRET Specification ZD-8-001 of the same revision as this issue. (By verbal agreement with WADC Pages 4, 5 and 6 have been omitted from the majority of copies of this specification in order that it may be classified CONFIDENTIAL to facilitate its distribution and handling by personnel who need it as a working document. A limited quantity of this specification classified as SECRET, including performance requirements, will be made available as required.)

3.1.3 WEIGHTS: For estimated weights see Group Weight Statement - AN9103 on Pages 7, 8 and 9.

[redacted]

AN-9103-C

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT

PAGE 7
MODEL YF-102& F-102A
REPORT ZD-8-001

CODE NO.		PROVISIONS FOR EQUIPMENT	STRUCTURE	LANDPLANE or SEAPLANE
1	WING GROUP			3,059
2	CENTER SECTION (OR UPPER CENTER)			
3	INTERMEDIATE PANEL (OR UPPER OUTER)			
4	OUTER PANEL ~~(OR LOWER CENTER)~~	212	2,468	
5	TIPS ~~(OR LOWER OUTER)~~		52	
6	AILERONS (COUNTER BALANCE WT. LBS.)			
7	FLAPS			
8	SLATS			
9				
10	TAIL GROUP			525
11	STABILIZER			
12	ELEVATOR (COUNTER BALANCE WT. LBS.)			
13	FIN	16	458	
14	RUDDER (COUNTER BALANCE WT. LBS.)		51	
15				
16	BODY GROUP			2,936
17	FUSELAGE ~~OR GONDOLA — LESS ENG. SECTION~~	118	2,818	
18	BOOMS			
19	HULL			
20	ALIGHTING GEAR - LAND TYPE			1,156
21	MAIN LANDING GEAR		948	
22	AUXILIARY LANDING GEAR (NOSE OR TAIL WHEEL)		208	
23	BUMPER (WHEEL OR SKID)			
24				
25	ALIGHTING GEAR - WATER TYPE			
26	MAIN FLOATS			
27	AUXILIARY FLOATS			
28	ENGINE SECTION or NACELLE GROUP			
29	INNER			
30	CENTER			
31	OUTER			
32				
33	POWER PLANT GROUP			6,084
34	ENGINE (AS INSTALLED)		4,825	
35	ENGINE ACCESSORIES		833	
36	POWER PLANT CONTROLS		17	
37	PROPELLERS			
38	STARTING SYSTEM		46	
39				
40	COOLING SYSTEM			
41	RADIATORS & SHUTTERS			
42	LIQUID			
43	PIPING ETC.			
44	~~LUBRICATING SYSTEM~~ Auxiliary Oil Cooling System		65	
45	TANKS AND PROTECTION			
46	PIPING ETC.			
47	FUEL SYSTEM		298	
48	TANKS AND PROTECTION			
49	PIPING ETC.			
50	TOTALS (TO BE BROUGHT FORWARD)			13,760

AN -9103-C

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT (Contd.)

PAGE 8
MODEL YF-102& F-102A
REPORT ZD-8-001

CODE NO.				LANDPLANE or SEAPLANE
1	FIXED EQUIPMENT GROUP			4,194
2	INSTRUMENTS		130	
3	SURFACE CONTROLS		390	
4	HYDRAULIC SYSTEM		446	
5	ELECTRICAL		417	
6	COMMUNICATING		1,477	
7	ARMAMENT PROVISIONS (INCLUDING GUNFIRE PROTECTION)		642	
8	FURNISHINGS		599	
9	PERSONNEL ACCOMMODATIONS			
10	EMERGENCY ACCOMMODATIONS			
11	PROVISIONS FOR FLIGHT			
12	AIR CONDITIONING EQUIPMENT			
13	ANTI-ICING EQUIPMENT		60	
14	AUXILIARY POWER PLANT			
15	AUXILIARY GEAR		33	
16	ANCHOR, TOWING & HOISTING GEAR			
17	ARRESTING GEAR INSTALLATION			
18	EMERGENCY FLOTATION GEAR			
19	SERVICE PICKUP			
20	TOTALS (FROM PAGE 2.0)			13,760
21	WEIGHT EMPTY			17,954

UNIT WEIGHTS

WING GROUP (GROSS AREA 661.5 SQ.FT.) LBS. PER SQ.FT.	4.62
TAIL GROUP (GROSS AREA 68.33 SQ.FT.) LBS. PER SQ.FT	7.68
SUBMERGED DISP. MAIN FLOATS OR HULL ( )	
WEIGHT OF MAIN FLOATS AND BRACING ( )	
WEIGHT OF COOLING SYSTEM PER NORMAL H.P. (H.P.)	
WEIGHT OF LUBRICATING SYSTEM PER GAL. OIL CAP. (GAL. OF OIL)	
WEIGHT OF FUEL SYSTEM PER GAL. CAP. (1050 GAL. OF FUEL)	.28

DESIGN INFORMATION

LENGTH - MAX.	52' 6"	MAXIMUM FUSELAGE DEPTH	6' 2"
HEIGHT - MAX.	18' 0"	MAXIMUM FUSELAGE WIDTH	6' 2"
SPAN	37' 0.2" (actual)	DESIGN GROSS WEIGHT	26,404
THICKNESS ROOT CHORD	4%	GROSS WEIGHT FOR STRESS ANALYSIS	22,895 (flight)
THICKNESS TIP CHORD			21,524 (ldg)
WING AREA - NET			
LOAD FACTOR - ULTIMATE	Maneuver 10.5*		
TAPER RATIO (ROOT CHORD/TIP CHORD)	Delta		
LENGTH ROOT CHORD	34' 8.3"	TOTAL BULLET PROOF GLASS	Windshield 122 POUNDS
LENGTH TIP CHORD	0	TOTAL ARMOUR PLATE	POUNDS

REMARKS

"PROVISIONS FOR" CAN BE INTERPRETED AS FOLLOWS:

1. ALL PARTS ASSEMBLED TO ONE BASIC UNIT FOR THE SOLE PURPOSE OF PRODUCING A SUPPORT OR MOUNT FOR EQUIPMENT OR STRUCTURAL UNITS OF ANOTHER BASIC GROUP.
2. IF THE CONTRACTOR'S SYSTEM OF WEIGHT BREAKDOWN INCLUDES ITS PROVISIONS WITH THE BASIC GROUPS, THEN WEIGHTS ORDINARILY ENTERED ON PAGES TITLED "INSTALLATION PROVISIONS FOR" ARE NOT REQUIRED.

SERVICE PICK-UP DOES NOT INCLUDE ENTRAPPED FUEL & OIL

* At Room Temperature

AN-9103-C

	NAME	DATE
PREPARED		
CHECKED		

GROUP WEIGHT STATEMENT (Contd.)

PAGE 9
MODEL YF-102 & F-102A
REPORT ZD-8-001

	USEFUL LOAD			Alternate	Ferry
	LOAD CONDITION	LANDPLANE (SPEC.)	SEAPLANE (SPEC.)	~~LANDPLANE (ACTUAL)~~	~~SEAPLANE (ACTUAL)~~
1	CREW (NO.)	230		230	230
2					
3	PASSENGERS (NO.)				
4	FUEL – ENGINE (1050 GALS.)	6,825		6,825	10,075
5	FUEL – TRAPPED IN SYSTEM (GALS.)	60		60	60
6	FUEL – AUXILIARY POWER PLANT (GALS.)				
7	OIL – ENGINE (GALS.)	25		25	25
8	OIL – TRAPPED IN SYSTEM (GALS.)	25		25	25
9	OIL – AUXILIARY POWER PLANT (GALS.)				
10	OIL – SUPERCHARGER (GALS.)				
11	OIL – REDUCTION GEAR BOX (GALS.)				
12	BAGGAGE				
13	Ferry Fuel System				750
14	CARGO				
15					
16	ARMAMENT				
17	FIXED GUNS (TOTAL)				
18	CAL. GUN INSTALLATION				
19	CAL. AMMUNITION				
20	CAL. GUN INSTALLATION				
21	CAL. AMMUNITION				
22	MM. CANNON INSTALLATION				
23	MM. AMMUNITION				
24					
25					
26	GUN SIGHTS				
27	FLEXIBLE GUNS (TOTAL)				
28	CAL. GUN INSTALLATION				
29	CAL. AMMUNITION				
30	CAL. GUN INSTALLATION				
31	CAL. AMMUNITION				
32	MM. CANNON INSTALLATION				
33	MM. AMMUNITION				
34	Missiles MX-904 (6)	750			
35	Missile Launchers (6)	60			
36	BOMB INSTALLATION				
37	Rockets 2.75 HVAR (24)	432			
38	Rockets 2.75 HVAR (96)			1,728	
39	TORPEDO INSTALLATION				
40	Rocket Pods (6)			375	
41	Air Bottles (2)			48	
42	EQUIPMENT				
43	NAVIGATION				
44	OXYGEN				
45	PHOTOGRAPHIC				
46	PYROTECHNICS				
47	MISCELLANEOUS				
48	Survival Kit	18		18	18
49	Cooling Water	25		25	25
50	USEFUL LOAD	8,450		9,359	11,208
51	WEIGHT EMPTY	17,954		17,954	17,954
52	GROSS WEIGHT	26,404		27,313	29,162

[redacted]

3. REQUIREMENTS (Cont)

3.1.3.1	Alternate Armament Loading (96 Rockets)....	Lb	27,313
3.1.3.2	Take-Off Gross Weight (Design Useful Load) .	Lb	26,404

3.1.4 CENTER OF GRAVITY LOCATIONS:

Take-off gross weight, center of gravity location, wheels up:

Aft leading edge of MAC..................	% MAC	30.9
Above leading edge of MAC....	Inches	5.1

Take-off gross weight, center of gravity location, wheels down:

Aft leading edge of MAC..................	% MAC	30.9
Above leading edge of MAC..............	Inches	3.8

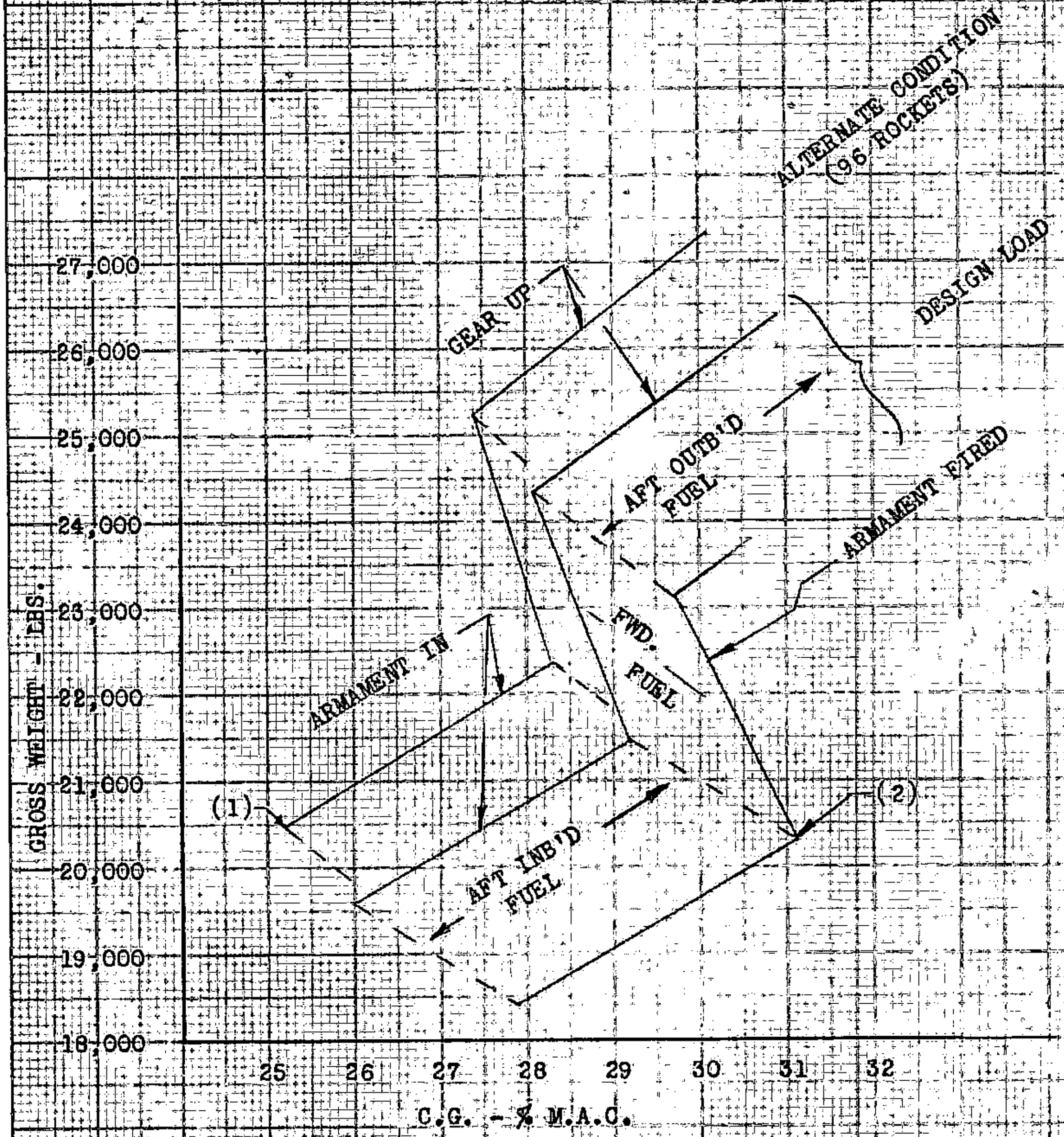
Extreme positions of center of gravity possible in flight at weights indicated

	Most Fwd		Most Aft	
	% MAC	Above Leading Edge MAC (In.)	% MAC	Above Leading Edge MAC (In.)
Wheels Up	25.2	6.2	---	---
Wheels Down	---	---	31.1	5.9
Weight	20,436 lb *		20,278 lb **	

* Point (1) on Curve of Page 11.
** Point (2) on Curve of Page 11.

3.1.4.1 See Figure 3, Page 11, for Chart of Center of Gravity Limitations.

[redacted]



AIRPLANE CENTER OF GRAVITY
Figure 3

359T-11G KEUFFEL & ESSER CO.
10 X 10 to the ½ inch, 5th lines accented.
MADE IN U.S.A.

[redacted]

3. REQUIREMENTS: (Cont)

3.1.5 AREAS (Not to be used for inspection purposes):

Wing area, total, including elevons	661.5 sq ft
Elevon area, aft of hinge line	67.12 sq ft
Vertical Tail area, total	68.33 sq ft
Fin	57.86 sq ft
Rudder, aft of hinge	10.47 sq ft

3.1.6 ① DIMENSIONS AND GENERAL DATA (Not to be used for inspection purposes):

Wing	
Span, maximum (theoretical)	38 ft 1.6 in.
Chord	
At root	34 ft 8.3 in.
At tip (theoretical)	0
Mean aerodynamic	23 ft 1.5 in.
Airfoil section	
Designation	NACA 0004-65(Mod)
Thickness (percent chord)	4
Incidence (degrees)	
At root	0
At tip	0
Sweepback of leading edge	60 degrees
Dihedral	0 degrees
Aspect ratio	2.2
Elevons	
Span, each	13 ft 2 in.
Chord	
Tip	2 ft 0.4 in.
Root	3 ft 2.2 in.

Tail	
Vertical	
Airfoil Section	
Designation	NACA 0004-65(Mod)
Thickness (percent chord)	4
Sweepback of leading edge	60 degrees
Aspect ratio	1.10

[redacted]

3. REQUIREMENTS: (Cont)

Height over vertical tail	
Reference line level	18 ft 0 in.
Three-point position	18 ft 0 in.
Length, maximum	52 ft 6 in.
Distance from 25% MAC to rudder 25% chord line.	17 ft 3.6 in.
Ground angle	21 degrees
Wheel rim size	
Main wheels	15 inches
Nose wheel	14 inches
Tire size	
Main wheels	30 x 8.8
Nose wheel	24 x 5.5
Tread of main wheels	14 ft 8.5 in.
Wheelbase	20 ft 0.4 in.
Vertical travel of axle from extended to fully compressed position	
Main wheels	10 inches
Nose wheel	8 inches
* Angle between lines joining center of gravity with points of contact of main wheel tires, static deflection of 1W (front elevation)	100°
* Angle of line through center of gravity and ground contact point of main wheel tire to vertical line, reference line level, static deflection of 1W (side elevation)	23° 25'

* At C.G. of point (2) on Figure 3, Page 11.

[redacted]

3. REQUIREMENTS: (Cont)

3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS (Not to be used for inspection purposes): Control surface and control movements on each side of neutral position for full movement as limited by stops, are as follows:

Rudder	25° right	25° left
Rudder pedals	3.25" fwd	3.25" aft
Elevons (as elevators)	25° up	10° down
Elevon Control (stick)	5" fwd	9" aft
Elevons (as ailerons)	9° up	9° down
Elevon Control (stick)	7" right	7" left
Speed brakes	60° maximum travel	

3.2 GENERAL:

3.2.1 GENERAL INTERIOR ARRANGEMENT: The interior of the fuselage shall be arranged from nose to tail to provide the following:

(a) A nose section consisting of a radome to house the radar antenna and radar equipment portion of MX-1179.

(b) A pressurized pilot's compartment with seat, controls and equipment. A section to house the nose wheel in the retracted position is located below the floor of this compartment.

(c) A section to accommodate the communication, navigation and primary electrical supply components of the MX-1179 equipment.

(d) An armament section to house the missiles and rockets, and their displacing gear. The upper portion of this section will also contain the electrical power supply and refrigeration equipment. Through this bay passes the forward wing spar.

(e) A section to accommodate one turbo-jet engine with wells in the lower portion to house the main landing gear in the retracted position. Through this section pass the wing main and rear spars.

[redacted]

3. REQUIREMENTS: (Cont)

(f) An aft compartment containing the engine afterburner control system valves and linkages, and speed brakes.

3.2.2 (60) (85) MATERIALS: Materials shall be in accordance with applicable specifications and shall be selected in accordance with ANA Bulletin 143, except as otherwise noted herein and in Appendix II. Castings shall be designed and inspected in accordance with Specification MIL-C-6021A.

3.2.3 WORKMANSHIP: Workmanship shall conform to high grade aircraft practice as defined by the Contractor's quality control procedures.

3.2.4 PRODUCTION, MAINTENANCE AND REPAIR: In the design of the airplane, consideration shall be given to ease of production, rapid power plant and equipment installation and ease of servicing and maintenance. Special attention shall be given to simplification of accessibility for routine checks of equipment and provisions for general field maintenance at advance bases where elaborate ground equipment is not usually available. Servicing provisions shall be designed to permit maximum utilization of the airplane under combat conditions. Special tools shall be limited to the practicable minimum and shall conform to Specification No. AN-D-17.

3.2.5 (90) (91) INTERCHANGEABILITY AND REPLACEABILITY: The component parts of the airplanes shall be interchangeable or replaceable, as the case may be, in accordance with and to the extent required by Specification No. AN-I-21, and shall be manufactured in conformity with the provisions of such specification, as noted in Appendix III herein.

3.2.6 FINISH: The finish for the airplane and parts shall be in accordance with the Contractor's finish specification which shall be in general accordance with Specification No. 3-100J. In general, exterior and interior paint is not required.

3.2.7 IDENTIFICATION AND MARKING: The airplane and components thereof shall be identified and otherwise marked in accordance with Specifications No. AN-M-13a(1) and 98-24105S(3).

[redacted]

3. REQUIREMENTS: (Cont)

3.2.8 EXTREME TEMPERATURE OPERATION: The aircraft as a whole, including aeronautical equipment, shall be so constructed that it will function satisfactorily in any or all temperature conditions that will be encountered. A ground temperature of -65°F has been established as the minimum temperature at which the aircraft shall operate. See curve on page 6 for maximum operating temperature.

3.2.9 CLIMATIC REQUIREMENTS: The aircraft and its equipment shall not be adversely affected by other climatic conditions incident to the above temperature range, and shall be capable of transfer from one climate to another without penalty of extensive modification and adjustment.

3.2.10 LUBRICATION: Lubrication of the airplane shall be in accordance with Specification No. MIL-L-6880.

3.2.11 STANDARD PARTS: The use of standard parts shall be in accordance with the requirements of Paragraph 3.2.2.

⑱ thru (21a) (21b) (21c) (38a)

3.2.11.1 Bearings shall meet the requirements of the applicable revision of the Handbook of Instructions for Aircraft Designers, except as noted in the specifications for bearings listed in Air Force Bulletin No. 59, dated 1 January 1951 and deviations of Appendix II.

3.2.12 CREW: The crew shall consist of one pilot.

3.2.13 EQUIPMENT INSTALLATION:

3.2.13.1 ARMAMENT: Complete provisions shall be made for mounting and firing the following weapons:

Rocket	- 2.75" FFAR	24
Guided Missile	- MX-904	6

3.2.13.1.1 ARMAMENT - ALTERNATE ARRANGEMENT: Provisions shall be made for carrying the following alternate armament arrangement:

Rocket	- 2.75" FFAR	96
Guided Missile	-	0

[redacted]

3. REQUIREMENTS: (Cont)

Rocket tube packages and other accessories for utilizing this alternate arrangement shall be provided.

3.2.13.2 COMMUNICATION AND NAVIGATION EQUIPMENT: Part of Hughes Electronic and Control System (MX-1179).

3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION: The equipment and furnishings listed in Appendices I-A, I-B and I-C of this model specification, and as may be described in other portions of this model specification, shall be installed in the quantity and under the conditions specified herein.

[redacted]

3. REQUIREMENTS: (Cont)

3.3 AERODYNAMICS:

(105) (106)

3.3.1 GENERAL: The airplane shall be designed and constructed to provide the maximum surface smoothness and trueness of aerodynamic contour that are consistent with rapid and economical manufacturing techniques and that are required for high performance.

3.3.2 STABILITY AND CONTROL:

3.3.2.1 The stability and controllability of the airplane shall be in accordance with Specification No. 1815B, except as noted in Appendix II.

(94) thru (103)

3.3.2.2 PERMISSIBLE AERODYNAMICS CENTER OF GRAVITY LIMITS: The aerodynamic limit at take-off shall be as shown on the curve of page 11. If equipment or armament is omitted, equivalent ballast shall be carried.

3.3.2.3 It shall be possible to open the speed brakes in three seconds from fully closed position to the position corresponding to 90% of nominal hydraulic system force, which corresponds to 2700 psi in the actuating cylinder. It shall be possible to open the speed brakes to any intermediate position.

3.3.2.4 The longitudinal deceleration provided by the speed brakes shall be at least 0.3g at 400 knots IAS and shall not be required to exceed 0.5g at any higher speed.

[redacted]

② ④ thru ⑫ ㉓ ㉖ ㉗ ㉙ ㉚ (86)

3. REQUIREMENTS: (Cont)

3.4 STRUCTURAL DESIGN CRITERIA: Stress analysis criteria shall be as set forth in Convair Report No. ZU-8-003. (All structural limitations are predicated on the eventual installation of the YJ67-W-1 engine.)

3.4.1 LIMIT FLIGHT LOAD FACTORS:

3.4.1.1 Structural Design Gross Weight . . . . 22,895 lb

Maneuver: Positive 5.33* Negative -3.0

3.4.1.2 Maximum Alternate Weight (Ferry Condition). . . . . 28,583 lb

Maneuver: Positive 3.0 Negative -1.0

3.4.1.3 Minimum Flying Weight . . . . 17,795 lb

3.4.2 LIMIT GROUND LOAD FACTORS:

Taxiing:

Ground Maneuver @ Take-off (at take-off gross weight of 28,583 lb). 2.0

Landing:

Ground Landing (at take-off with maximum alternate weight of 28,583 lb) . . . . 2.0 (approx)

Ground Landing (at landing weight of 21,524 lb). 3.0 (approx)

3.4.3 LIMIT DIVING SPEED: See Figure 2B, page 6, for limit diving speeds. The limit dive speed for structural design is as indicated by curve 1. A placard (red light) will be placed on the airplane to actuate at the limit established by curve 2, which corresponds to a stagnation temperature of 225°F. The characteristics of certain special materials such as windshield glass (vinyl separation), integral fuel tank sealing materials, etc., are such that they may limit the usable maximum

(* At elevated temperatures - approximately 7.0 cold)

[redacted]

3. REQUIREMENTS: (Cont)

speed. Determination of the usable maximum speed can only be made through a process of flight testing, at which time curve 2 can be raised. Curve 3 shows the maximum Mach No. for design in the "Ferry" condition and is above the speed for maximum range.

[redacted]

3. REQUIREMENTS: (Cont)

3.5 WING GROUP:

3.5.1 DESCRIPTION AND COMPONENTS: The wing shall be a delta wing in planform and shall include two elevons, integral fuel tanks and provisions for attachment of main landing gear and other equipment.

(51)

3.5.2 CONSTRUCTION:

3.5.2.1 The wing shall be basically of full cantilever, stressed skin, high strength aluminum alloy construction employing spanwise spars of built-up shearweb type and chordwise ribs and bulkheads.

3.5.2.2 A portion of the wing interspar area outboard of the fuselage shall be designed for integral fuel tanks.

3.5.2.3 The wing leading edges shall be designed for thermal anti-icing.

3.5.2.4 Wing tips shall be removable.

3.5.3 ELEVONS: Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be of riveted metal torque box and rib construction with metal covering.

Differential motion (as ailerons)...........	None
Distance from plane of symmetry to centroid of elevon area..............................	8 ft 9 in.
Type of balance	None
Tabs	None

3.5.4 LIFT AND DRAG INCREASING DEVICES: None included as a portion of the Wing Group. See paragraphs 3.6.4.1 and 3.7.1.6.

[redacted]

3. REQUIREMENTS: (Cont)

3.6 TAIL GROUP:

3.6.1 DESCRIPTION AND COMPONENTS: The tail group shall consist of a single vertical fin and rudder.

3.6.2 STABILIZER: Not applicable.

3.6.3 ELEVATOR: Not applicable.

3.6.4 FIN: The fin shall be basically of riveted cantilever, high strength aluminum alloy construction attached to the fuselage and including provision for attachment of the rudder. The structure shall consist of spars and ribs with stressed metal covering. The leading edge shall be designed for thermal anti-icing. The tip shall be electrically isolated by plastic material in order to satisfy the antenna requirements.

3.6.4.1 BRAKE PARACHUTE: A brake parachute shall be installed at the base of the vertical tail to provide additional or auxiliary braking power for use on ice-covered runways or when landing on short runways.

3.6.5 RUDDER: The rudder shall be of riveted metal torque box and rib construction with metal covering. Trim tabs are not required. Balancing of rudder is not required.

[redacted]

3. REQUIREMENTS (Cont)

3.7 BODY GROUP:

3.7.1 FUSELAGE:

3.7.1.1 DESCRIPTION: The fuselage shall be arranged as specified in Paragraph 3.2.1.

3.7.1.2 CONSTRUCTION: The fuselage shall be basically of riveted, high strength aluminum alloy construction with bulkheads and beltframes and stressed-skin metal covering. Corrosion and heat-resisting material shall be used where required in the engine section. Heat-resistant, transparent material shall be used for the transparent portion of the pilot's enclosure.

3.7.1.3 CREW AND PERSONNEL STATIONS:

3.7.1.3.1 ⑬ The pilot's compartment shall include provision for one ejection seat, flight controls, power plant and accessory controls and instruments, flight instruments, and armament controls as specified in Paragraph 3.18.3.5. The center of the instrument panel shall accommodate the pilot's display component of the MX-1179 Electronics and Control System.

3.7.1.3.2 The pilot's compartment shall be designed to be pressurized as specified in Paragraph 3.20.1.1.1.

3.7.1.3.3 A separate ladder or platform shall be required for the pilot to enter and leave the airplane.

3.7.1.3.4 The pilot's compartment shall be equipped with a hinged canopy, which shall be spring-balanced for manual operation, for normal entrance and exit and which shall be capable of being jettisoned by means of a canopy remover fired as a part of the seat ejection sequence for emergency exit in flight. Provisions shall be installed for opening and/or jettisoning of cockpit canopy externally, and instruction placard shall be installed adjacent thereto in accordance with Specification 98-24105S, Page 10/

[redacted]

3. REQUIREMENTS (Cont)

3.7.1.3.5 The maximum practicable hemispherical visibility shall be provided to either side of the forward line of sight, and to either side above and below the line of sight. The forward and downward visibility over the nose shall be 15° to the wing chord plane.

3.7.1.3.6 The pilot's windshield shall be fabricated from tempered glass.

(12a)

3.7.1.3.7 The cockpit configuration shall be arranged to accommodate an ejection seat approved by WADC.

3.7.1.4 CARGO COMPARTMENTS: Not applicable.

3.7.1.5 EQUIPMENT COMPARTMENTS: Space and weight provisions shall be made to install MX-1179 Electronics and Control System equipment having a total volume of 42 cubic feet in and adjacent to the pilot's compartment. The detail distribution of this equipment shall be jointly determined with Hughes Aircraft Company. Ready access shall be provided for all components of the MX-1179 Electronic and Control System requiring adjustment and preflight checks.

3.7.1.6 SPEED BRAKES: Three speed brake panels shall be provided. These shall be located in the aft portion of the fuselage; one on the bottom and the other two between the wing and vertical stabilizer. They shall be hydraulically operated with no preselected positioning provisions. Locks shall be provided for the closed position only. Safety pins shall be provided to hold the speed brake doors open to prevent inadvertent actuation of the doors during maintenance.

3.7.1.7 ROCKET AND MISSILE BAYS: Provisions to accommodate the armament, as specified in Paragraph 3.18.3, shall be incorporated in the lower portion of the fuselage forward of the main landing gear.

3.7.1.7.1 The rocket and missile bays shall accommodate the installation of the ferry fuel tanks referened in Paragraph 3.12.9.1.

3.7.1.8 WHEEL WELLS: Provision shall be made to house the nose wheel and portions of the two main wheel landing gear units in the fuselage.

3.7.2 HULL: Not applicable.

[redacted]

3. REQUIREMENTS: (Cont)

3.8 ALIGHTING GEAR:

⑯ ⑰

3.8.1 GENERAL DESCRIPTION AND COMPONENTS: The landing gear shall be of the retractable, tricycle type, consisting of a nose gear unit and two main gear units.

3.8.2 MAIN LANDING GEAR:

3.8.2.1 DESCRIPTION: The main landing gear shall consist of two units attached to the wing structure and retracting into wells in the wing and fuselage. Each unit shall include a shock absorber strut and one wheel, tire, tube and brake.

3.8.2.2 (88) (88a) WHEELS, BRAKES AND BRAKE CONTROL SYSTEMS: The main wheels shall be 30 x 8.8, Type VII and shall be equipped with pneumatic brakes. The brakes shall be actuated by means of toe controls which form an integral part of the pilot's rudder pedals. The brake system shall be in accordance with Specification No. AN-B-2, except as noted in Appendix II. Anti-skid devices are not required.

3.8.2.3 ⑮ TIRES AND TUBES: The main wheel tires and tubes shall be 30 x 8.8, Type VII.

3.8.2.4 (158) thru (163) SHOCK ABSORBERS: Each main landing gear unit shall include one shock absorber strut designed in accordance with Specification No. 40228J(4) and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

3.8.2.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS: The main landing gear shall be hydraulically retracted and extended by means of a control located convenient to the pilot. Safety devices shall be provided to prevent inadvertent retraction of the main landing gear when the airplane is on the ground. Positive mechanical locks shall be provided in both the extended and retracted positions.

3.8.2.6 (17a) DOORS AND FAIRINGS: Hinged doors and fairings shall be provided to cover the main landing gear wells in the fuselage and wing.

[redacted]

3. REQUIREMENTS: (Cont)

3.8.2.7 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the main landing gear units requiring inspection, maintenance and servicing including lubrication, and for removal and replacement of parts subject to wear in service.

3.8.3 AUXILIARY LANDING GEAR (Tail Wheel): Not applicable.

⑭

3.8.4 AUXILIARY LANDING GEAR (Nose Wheel):

3.8.4.1 DESCRIPTION: The nose landing gear shall consist of a single steerable unit attached to the fuselage structure and retracting into a well in the nose. This unit shall include a shock absorber strut and one wheel, tire and tube.

3.8.4.2 WHEEL: The nose wheel shall be 24 x 5.5, Type VII.

3.8.4.3 TIRE AND TUBE: The nose wheel tire and tube shall be 24 x 5.5, Type VII EHP.

3.8.4.4 (158) thru (163) SHOCK ABSORBER: The nose landing gear unit shall be quipped with one shock absorber strut designed in accordance with Specification No. 40228J(4), and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

3.8.4.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS: The nose landing gear unit shall be hydraulically retracted and extended by means of the control specified in Paragraph 3.8.2.5. Safety devices shall be provided to prevent inadvertent retraction of the nose landing gear when the airplane is on the ground. A positive mechanical lock shall be provided in both the extended and retracted positions.

3.8.4.6 (17a) DOORS AND FAIRINGS: Hinged door(s) shall be provided to enclose the nose wheel well in the nose of the fuselage.

3.8.4.7 STEERING CONTROL: Provision shall be made for hydraulically steering the nose wheel by means of the pilot's rudder pedals.

[redacted]

3. REQUIREMENTS: (Cont)

3.8.4.8 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the nose landing gear unit requiring inspection, maintenance and servicing, including lubrication, and for removal and replacement of parts subject to wear in service.

3.9 ALIGHTING GEAR (Water Type): Not applicable.

[redacted]

3. REQUIREMENTS: (Cont)

3.10 SURFACE CONTROL SYSTEM:

3.10.1 ㉛ ㉜ ㊳ (104) PRIMARY FLIGHT CONTROL SYSTEM: The primary flight control system shall be an irreversible, full-hydraulic power system, including artificial feel and trimming devices. The irreversible power actuators shall also serve as the automatic flight servos, and shall be designed to function in conjunction with the MX-1179 Electronic and Control System to provide satisfactory airplane performance during all automatic flight operations. A dual hydraulic power system shall be provided as described in Paragraph 3.15.1. The control system shall be in accordance with Handbook of Instructions for Aircraft Designers (HIAD), except as noted in Appendix II.

3.10.1.1 ㉝ ㉞ FLIGHT STATION CONTROLS: The cockpit elements of the flight control system shall include the pilot's rudder pedals, control stick and trim controls.

3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS:

3.10.2.1 LIFT AND DRAG INCREASING DEVICE SYSTEMS: Provisions for the release and jettison of the brake parachute shall be installed in the cockpit conveniently located for use by the pilot.

3.10.2.2 SPEED BRAKES: Provision shall be made to extend and retract the speed brakes by a switch located on the throttle control lever.

3.10.3 ㉜ TRIM CONTROL SYSTEMS: The primary flight control system shall include trimming devices. The trimming devices shall operate in such a manner as to prevent objectionable control stick and surface motion when the automatic control system is disengaged.

3.10.4 AUTOMATIC FLIGHT CONTROL INSTALLATION: The functions of an automatic flight system shall be included in the MX-1179 Electronic and Control System equipment. This equipment shall be interconnected to, and shall serve to satisfactorily operate, the various airplane control systems required for automatically accomplishing the prescribed phases of the mission of the airplane. All control elements shall be so located as to simplify inspection, maintenance and servicing procedures.

[redacted]

3. REQUIREMENTS: (Cont)

3.10.4.1 The control system tie-in (CSTI) of the MX-1179 shall be installed to provide gyro stabilized flight when the radar is not operated, using the rate gyroscopes. This mode of operation shall be available to the pilot through manually-controlled switches as an artificially stabilized system. An automatic pilot controller is not required.

[redacted]

3. REQUIREMENTS (Cont)

3.11 (52) (60) (56) (61) ENGINE SECTION: The aft section of the fuselage shall be designed to accommodate the turbo-jet engine specified herein. A firewall shall be provided and the engine shall be shrouded as necessary for cooling and fire protection purposes.

3.11.1 DESCRIPTION AND COMPONENTS: The engine section is located in the aft section of the fuselage and designed to accommodate the specified turbo-jet engine.

3.11.2 CONSTRUCTION: See Paragraph 3.7.1.2, Fuselage Contruction.

3.11.3 ENGINE MOUNTS: Provision shall be made to mount the specified turbo-jet engine.

3.11.4 VIBRATION ISOLATORS: Vibration isolators are not required.

3.11.5 (60) FIREWALLS: For fire protection, a vertical firewall shall be provided at the engine fire wall to divide the engine compartment into two compartments. A fire wall shall be installed between wing fuel tanks and engine compartments (between upper and lower wing attach angles from bulkhead 442.2 to 513.5). Fire resistance shrouds shall be installed around the fuel shut off valves.

3.11.6 COWLING AND COWL FLAPS: Not required.

3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE: Removable panels shall be provided as required for access to the engine installation for inspection and maintenance.

[redacted]

3. REQUIREMENTS (Cont)

3.12 PROPULSION:

3.12.1 GENERAL DESCRIPTION AND COMPONENTS: The propulsion group includes the turbo-jet engine specified below, the required accessories, and related systems. Engine inlet screen will not be required.

3.12.2 MAIN PROPULSION UNIT:

3.12.2.1 The airplane shall be equipped with one Pratt & Whitney J57-P-11 turbo-jet engine in general accordance with Pratt & Whitney Specification No. A-1647, and rated at 14,800 pounds of thrust, static at sea level. The engine shall be in accordance with Pratt & Whitney Drawing No. 208301.

(a) (Deleted).

(b) (Deleted).

(c) (Deleted).

(d) Any future revisions shall be mutually acceptable to Pratt & Whitney and the Contractor.

3.12.3 AUXILIARY PROPULSION UNIT: Not required.

3.12.4 ENGINE-DRIVEN ACCESSORIES: Two hydraulic pumps and one tachometer generator shall be installed on and driven by the engine.

3.12.5 AIR INDUCTION SYSTEM: Air inlets, with boundary layer bleeds, shall be located on each side of the fuselage adjacent to the pilot's compartment with ducts extending aft to the engine. The air inlet duct lips shall have provisions for anti-icing as specified in Paragraph 3.20.2.1.

3.12.6 EXHAUST SYSTEM: The engine shall be furnished complete with exhaust system, including afterburner with variable area nozzle.

3.12.7 COOLING SYSTEM: Adequate cooling for the engine, engine accessories aircraft equipment, components and structure shall be provided.

[redacted]

3. REQUIREMENTS (Cont)

3.12.7.1 Cooling air to the engine compressor and accessory compartment is supplied at the rate of 20#/min (approximately) by the air turbine motor exhaust after it is directed through the pilot's cockpit and forward airplane compartments. The air is exhausted through louvers forward of the engine fire wall. Cooling air for the engine and aircraft structure aft of the fire wall is supplied at the rate of 75#/min (approximately) by the oil cooler and wing tank pressurization heat exchange exit air. The air is exhausted around the afterburner nozzle at the aft end of the airplane.

3.12.8 (62) LUBRICATING SYSTEM:

3.12.8.1 (55) (63) thru (68) DESCRIPTION AND COMPONENTS: The specified engine shall be furnished complete with lubricating system, including oil tank, oil-fuel heat exchanger (oil cooler), pumps, lines, strainer and valves. An additional air oil cooler shall be provided by the Contractor, if necessary, to maintain required oil temperature.

3.12.8.1.1 A suitable access door shall be provided for oil tank servicing. Self-sealing quick disconnects shall be installed at the engine for the auxiliary oil cooler lines to allow removal of engine without draining the oil system.

3.12.9 FUEL SYSTEM:

3.12.9.1 (69) (70) (74) DESCRIPTION AND COMPONENTS: The fuel system shall include tanks, lines, pumps, valves and controls. The system shall be designed for the use of fuels conforming to Specification No. MIL-F-5624A, Grade JP-4, Space provisions for the installation of a ferry fuel system kit shall be provided. The system shall be placarded as to use of MIL-F-5572 gasoline as an emergency fuel.

3.12.9.2 (73) PUMPS: Two alternating current, electric motor-driven fuel booster pumps, conforming to Specification MIL-P-5238, shall be provided in the wing fuel tanks. Other pumps shall be as furnished with the specified engine.

[redacted]

3. REQUIREMENTS (Cont)

3.12.9.3 ㊾ (57) TANKS (Fixed): Two fuel tanks (one in each wing) consisting of three inter-connected compartments each, with a total net capacity of 1050 gallons (±2%) shall be provided as an integral part of the wing structure.

3.12.9.4 TANKS (Droppable): Droppable fuel tanks are not required.

3.12.9.5 ㊽ (71) (54) (72) VENT SYSTEM: The fuel tanks shall be vented in a manner consistent with fuel tank pressurization requirements. The vent system shall include the required lines, fittings, valves and equipment.

3.12.9.6 ㊼ (53) PIPING AND FITTINGS: All piping and connections in the fuel system shall be in accordance with applicable specifications and installed in accordance with the requirements of the HIAD, except as specified in Appendix II. Fuel system tubing minimum wall thickness shall be .035 for 2.00, 2.50 and 3.00 inch aluminum alloy tubing.

3.12.9.7 VALVES: Valves shall be provided as required and shall be in accordance with applicable specifications. Valves shall meet the test requirements set forth in Memorandum Report No. MCREXP-524-1854 Rev "A" dated 6 June 1950.

3.12.9.8 (75) STRAINERS AND FILTERS: Fuel system strainer(s) shall be provided and shall be as approved by WADC.

3.12.9.9 QUANTITY GAGES AND FLOWMETERS: A single instantaneous rate expanding scale type flow meter shall be provided for the turbine jet portion only. A fuel quantity gage system compensated characterized type in accordance with Specification MIL-G-7818 shall be provided. All tanks shall be totalized on a single indicator. The quantity gage shall be installed in accordance with Specification MIL-G-7940 in so far as practicable. Individual tank reading by selection switching arrangement shall not be required.

3.12.9.9.1 LOW LEVEL WARNING: A fuel low-level warning light shall be provided, which is actuated by means other than the gage.

3.12.9.10 (58) DRAINAGE PROVISIONS: Provision shall be made to drain fuel from the tanks.

[redacted]

3. REQUIREMENTS (Cont)

3.12.9.11 Deleted.

3.12.9.12 FUEL EVAPORATION CONTROL: Air shall be bled from the engine compressor section and shall be used to pressurize the fuel tanks to reduce fuel evaporation.

3.12.9.13 (55) (174) thru (178) REFUELING PROVISIONS: Pressure refueling provisions shall comply with the requirements set forth in Memorandum Report No. MCREXP-524-3006 with the exception of suction defueling as noted below, and deviations noted in Appendix II.

3.12.9.14 DEFUELING PROVISIONS: The fuel booster pumps shall be used for defueling on the ground.

3.12.10 WATER INJECTION SYSTEM: Not applicable.

3.12.11 (36) PROPULSION SYSTEM CONTROLS: A power control lever shall be provided for the pilot and connected to the power lever furnished with the specified engine.

3.12.11.1 Over heating of engine compartment structure shall be prevented by means of residual heat doors which are controlled by a switch located in the pilot's compartment. The residual heat doors shall have no intermediate positioning and shall be closed during flight.

3.12.12 STARTING SYSTEM: The starting system shall include an air turbine starter requiring an external source of compressed air. The main engine starting controls shall be located for use by the pilot.

3.12.12.1 A quickly attachable fitting for attaching the ground power source for starting shall be installed in the main wheel well.

3.12.13 PROPELLER: Not applicable.

3.12.14 ROCKET PROPULSION SYSTEM: Not required.

[redacted]

3. REQUIREMENTS (Cont)

3.13 AUXILIARY POWER PLANT: The auxiliary power unit shall consist of a modified Continental Model 140 gas turbine compressor (GTC), remotely located from the airplane, to provide compressed air. Provisions shall not be required for stowing this unit within the airplane.

3.13.1 The following shall be provided on the airplane for use with the GTC:

(a) A receptacle to supply power from the airplane D. C. bus to the GTC.

(b) Deleted.

(c) A fitting to connect the compressed air supply duct. A suitable cover shall be provided to protect this connection against debris thrown by the tires when the gear is retracted.

[redacted]

3. REQUIREMENTS: (Cont)

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT:

3.14.1 INSTRUMENTS: The following instruments shall be located on the pilot's instrument panel:

㉟ (76) (78)

- One combination air speed indicator and Machmeter
- One altimeter
- One attitude gyro
- One rate-of-climb indicator
- One turn and bank indicator
- One course deviation indicator
- One fuel level indicator
- One pilot's display (part of MX-1179)
- One clock
- One cabin pressure altimeter (on subpanel)
- Two single hydraulic pressure indicators
- One fuel flow indicator
- One oil pressure indicator
- One tachometer
- One turbine outlet temperature indicator
- One direct current loadmeter (on side panel)
- One alternating current voltmeter indicator light, and selector switch (on subpanel)
- One pneumatic pressure indicator
- One oxygen quantity indicator
- Three landing gear position indicators
- One compass bearing indicator

3.14.2 NAVIGATION EQUIPMENT: Included in MX-1179 Electronic and Control System equipment (See Section 3.17).

3.14.3 INSTALLATION: Instruments shall be installed in accordance with the HIAD, MIL-I-5072, and other applicable specifications, except as noted in Appendix II. The instrument arrangement shall be as approved by the Air Force.

(76a) (133) (77) (157) (131) (167) (132)

[redacted]

3. REQUIREMENTS: (Cont)

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS:

3.15.1 HYDRAULIC SYSTEM:

3.15.1.1 DESCRIPTION AND COMPONENTS: The hydraulic systems shall be in accordance with Specification No. MIL-H-5440, except as noted in Appendix II. The hydraulic configuration shall consist of two separate continuously-operating, closed center systems. The systems shall be of equivalent capacity each developing one half (1/2) the full hinge moment. Each system shall be powered by an engine-driven, 3000-psi, variable volume pump. One system will be considered as the primary system, to be used only for controls and emergency A.C. generator drive. The other system will be known as the secondary system, to be used for controls plus utility items such as landing gear, speed brakes, and nose wheel steering. Dual-tandem cylinders shall be provided on the elevons. A single tandem cylinder shall be provided on the rudder. Dual control valves shall be provided for each surface. The primary and secondary systems need not be interconnected, except mechanically, at the surface control valve and actuating cylinders. The primary system shall have priority over the secondary system in that few items are driven by the secondary system. Either system shall be capable of flying the airplane equally well under reduced maneuverability in the event of failure of the other. All utility items, when not in use, shall be shut off from the secondary system. If the primary system is inoperative, the landing gear shall be lowered by an emergency method, thus relieving possibility of failure to the secondary system at landing. To provide for failure of the power plant, which is the only source of continuous power, an emergency ram air-driven hydraulic pump shall supply power to the primary system for use of the controls. Hydraulic pumps shall be approved by Wright Air Development Center.

(138) thru (145) (150)

[redacted]

3. REQUIREMENTS: (Cont)

3.15.1.2 SUMMARY OF ACTUATED ITEMS: The hydraulic system shall be used to actuate the following items:

Surface control system
Landing gear extension and retraction and doors
Speed brakes
Nose wheel steering
Emergency A. C. Generator

㊲ (146) thru (149)

3.15.2 PNEUMATIC SYSTEMS:

3.15.2.1 LOW PRESSURE PNEUMATIC SYSTEM: A low pressure pneumatic system shall be provided to supply power for the air conditioning system, as described under Paragraph 3.20.

3.15.2.1.1 SUMMARY OF ACTUATED ITEMS: The low pressure pneumatic system shall be used to actuate the following items:

Cabin pressurization and air conditioning
Alternator, generator, air compressor drive
Fuel tank pressurization and purging
Wing and tail leading edge and air intake duct anti-icing
Pressurization and cooling of MX-1179 Electronic and Control System equipment
Canopy seal pressurization
Windshield de-fog
"G" suit or pressure suit
Ground cooling and heating of armament if necessary
Engine air starting system

3.15.2.2 HIGH PRESSURE PNEUMATIC SYSTEM: A high pressure pneumatic system shall be provided in accordance with Specification No. MIL-P-5518, except as noted in Appendix II.

3.15.2.2.1 DESCRIPTION AND COMPONENTS: The high pressure pneumatic system shall consist of an air flask that is charged by a 3000-psi air compressor, which is driven by the air turbine motor of the low pressure pneumatic system. The compressor shall be essentially in accordance with Specification MIL-C-6591, except for method of drive.

[redacted]

3. REQUIREMENTS: (Cont)

High pressure air stored in the flask shall supply energy for the system's operation.

3.15.2.2.1.1 SUMMARY OF ACTUATED ITEMS: The high pressure pneumatic system shall be used to actuate the following items:

Emergency landing gear extension
Armament displacement gear
Main landing gear brakes
Armament bay doors
Emergency canopy unlatch
Brake parachute doors
Hydraulic reservoir pressurization

[redacted]

3. REQUIRE[redacted]

3.16 ELECTRICAL:

3.16.1 DESCRIPTION: The electrical system shall consist of a 28-volt direct current system, a 200/115-volt, 400-cycle, three-phase system, and a power system consisting of a MX-1179 generator supplying voltages for operation of the unit. Provision shall be made for emergency operation of essential alternating current loads from (a) a hydraulic driven A.C. generator, (b) a 3-phase 115-volt instrument inverter.

3.16.2 ELECTRICAL POWER SUPPLY:

3.16.2.1 (107) thru (112) (173) DIRECT CURRENT: Direct current power shall be supplied by a 75-ampere, 30-volt generator. The generator shall be driven by the air turbine and shall be liquid cooled. The D.C. generator control system shall be of a special simplified design approved by WADC, utilizing a standard control panel. The system shall include an "essential" and a "nonessential" bus with provisions for automatically disconnecting the nonessential bus in the event of generator failure. A 24-volt, 36-ampere-hour battery, AN3150-2, shall be installed and connected to the essential direct current bus. A cover shall be provided for the battery. Means shall be provided to inspect battery fluid level and to check specific gravity of fluid. Provision for voltage adjustment in flight is not required.

3.16.2.2 (107) (119) (173) ALTERNATING CURRENT: The alternating current power shall be supplied by a 12-KVA, 120/208-volt, three-phase A.C. generator. The A.C. generator shall be driven by the air turbine in the cabin air conditioning and pressurizing system, and shall be liquid cooled. A dummy load shall be provided, if necessary, to place sufficient load on the turbine. Equipment shall be provided on the expansion turbine to control the frequency of the A.C. generator output, as required. The A.C. generator control system shall be of a special simplified design approved by WADC, utilizing a standard control panel.

3.16.2.3 SPECIAL POWER: The power system of the MX-1179 shall be installed to meet the requirements of the MX-1179 equipment. Also, means shall be provided to supply power from the MX-1179 system to the airplane system in event of failure of the airplane generators. Under this condition, the MX-1179 equipment need not be fully operable.

[redacted]

3. REQUIREMENTS: (Cont)

3.16.3 ELECTRICAL POWER CONVERSION:

3.16.3.1 (115) INSTRUMENT POWER: Instrument power shall be supplied by a 200/115-volt, three-phase transformer. This power shall be used to operate the electrically-driven alternating current gyro instruments. A single-phase, 115/26-volt transformer shall be installed for operating the autosyn instruments. Normally, these transformers receive power from the airplane's alternating current bus.

3.16.3.2 (115) EMERGENCY POWER:

3.16.3.2.1 DIRECT CURRENT: With the MX-1179 generator operating, in the event of failure of the airplane D.C. generator, 28-volt D.C. power shall be supplied for the emergency bus only from the MX-1179 D.C. generator. In the event power is not available from the MX-1179 generator, D.C. power shall be supplied from the battery supplemented by a 10-amp transformer rectifier which shall derive its power from the emergency A.C. generator.

3.16.3.2.2 ALTERNATING CURRENT: Emergency power, in the event of failure of the main A.C. generator, shall be supplied from a 1-KVA, single-phase, 115-volt A.C. generator driven by a hydraulic motor. Three-phase emergency A.C. power shall be provided by an AN3499-1, 100-VA, three-phase, 115-volt inverter operating on the D.C. bus.

3.16.4 (120) (168) (169) (170) (172) EQUIPMENT INSTALLATION: Electrical equipment shall be installed in accordance with Specifications No. 32300E and MIL-E-7080, and USAF Exhibit TSEPE-6E-47, as applicable. The battery shall be so installed as to permit ease of replacement and shall be vented as required. Equipment shall be installed to operate in ambient temperatures within the limits of applicable specifications, except that higher temperatures during periods of time not to exceed five minutes will be permissible.

3.16.5 (134) (136) (137) WIRING: Wiring shall be installed in accordance with Specification No. MIL-W-5088, except as specified in Appendix II.

[redacted]

3. REQUIREMENTS (Cont)

3.16.6 BONDING: The airplane and equipment shall be bonded as required by Specification No. MIL-B-5087. Shielding shall conform to Specification No. MIL-W-5088.

3.16.7 (83) (170a) CONTROLS: Switches, circuit breakers, rheostats and resistors shall be provided as required and shall be in accordance with applicable specifications, or as otherwise approved by the WADC.

3.16.7.1 POWER CONTROL: The power control panel shall consist of: (a) Battery switch, (b) D. C. generator switch, (c) A. C generator switch, (d) A. C. external power switch, and (e) a simplified control on which the various possible failures will be indicated by indicator lights. The proper corrective action (such as bus disconnection, enabling emergency systems, etc.) shall be accomplished by rotating a pointer-knob to the indicator light warning of the trouble.

3.16.8 LIGHTING:

3.16.8.1 GENERAL: Lighting shall be installed in accordance with Specification No. MIL-L-6503(USAF). All lighting fixtures and accessory equipment shall be in accordance with applicable specifications or as otherwise approved by the WADC.

3.16.8.2 INTERIOR: Instrument lighting shall be in accordance with Specification No. MIL-L-6423. Console panels shall be of the edge-lighted type in accordance with Specification No. MIL-P-7788. Thunder-storm lighting with off-on switch shall be provided in lieu of Type C-4A spot light.

3.16.8.2.1 Built-in trouble lights shall be provided in the missile bay areas to facilitate maintenance and loading operations. Similar lights shall also be provided to facilitate maintenance and adjustment of the MX-1179 Electronic and Control system equipment. The location of the lights shall be as approved by the Mock-Up Board.

3.16.8.3 (164a) (166) EXTERIOR: Exterior lighting shall be in accordance with Specification No. MIL-L-6730, and the applicable portions of Specification MIL-L-6503(USAF). A taxi light shall be provided on nose landing gear door. Landing lights shall be installed on both main landing gear drag struts and shall provide the required illumination. The wing tip and tail

[redacted]

3. REQUIREMENTS (Cont)

lights shall be of a special design and shall be subject to approval by WADC.

3.16.9 IGNITION AND STARTING CONTROL SYSTEM: The ignition and starting control system shall be designed to the requirements of the manufacturer of the specified engine. Controls shall be located for ease of operation and shall be subject to WADC approval.

3.16.10 RECEPTACLES:

3.16.10.1 EXTERNAL POWER: Both direct and alternating current external power receptacles shall be provided for ground checking only. The receptacles shall be located as approved by the Mock-Up Board, and shall be accessible from the ground.

The direct current receptacle shall energize both the essential and non-essential buses. The direct current and alternating current receptacles shall conform to AN2552 and AN3114 respectively. External power shall not be provided for operation of the MX-1179 equipment. Power to drive the MX-1179 equipment on the ground shall be obtained from the Ground Air Conditioning system as specified in Paragraph 3.20.1.

3.16.10.2 (135) ELECTRICAL CONNECTORS: Electrical connectors shall conform to Specification No. MIL-C-5015, except that where special connectors are required, they shall be subject to WADC approval.

3.16.10.3 FUEL NOZZLE GROUNDING JACK: A fuel nozzle grounding jack shall be provided adjacent to the fuel tank filler connection and shall be identified in accordance with Drawing No. AND10439.

3.16.10.4 STATIC GROUND: A static ground shall be provided on the landing gear in accordance with USAF Drawing No. 49B7572.

3.16.11 INDICATORS:

3.16.11.1 ALARMS: Landing gear warning horn not required.

[redacted]

3. REQUIREMENTS (Cont)

3.16.11.2 SIGNAL ASSEMBLIES: Three landing gear signal assemblies, Spec-
(113) ification No. MIL-I-6839, shall be provided on the instrument panel to
indicate to the pilot the position of the landing gear units. A cabin
(114) altitude warning is not required.

3.16.11.3 WARNING LIGHTS: Warning lights shall be provided for low oxygen
pressure, fire, both hydraulic systems low pressure, loss of fuel tank
pressure, and excessive speed of the airplane. In addition, a sub-panel
(122) shall be provided on which all noncirtical warnings will be grouped.
In conjunction with this panel a "master warning light" shall be pro-
(165) vided on the pilot's instrument panel. The master warning system shall operate as follows. When a warning occurs, other than the four listed above, both the master warning light and the appropriate light on the sub-panel shall illuminate. The pilot shall then actuate a "reset" switch which shall extinguish the "master warning light", the system shall then be ready for the next warning. The individual warning lights on this system shall operate independent from the master warning system. The lights on the Power Control Panel, described in Paragraph 3.16.7.1 shall be a part of the Master Warning System. A switch shall be provided to test all the lights in the system. The warning to be included shall be as approved by the Mock-Up Board. The warning lights on the sub-panel shall be of a design approved by WADC.

3.16.11.4 METERS: A direct current loadmeter and an alternating current volt-
(121) meter shall be provided on the instrument panel but need not be located
in close proximity to the generator and alternator controls. The alter-
(122) nating current voltmeter shall be provided with a selector switch to
check various alternating current voltages.

3.16.12 ELECTRIC DRIVES: Electric motors shall be in general accordance with Specification No. AN-M-40. Specifications shall be prepared for all electro-mechanical actuators used in the airplane. These specifications shall include applicable environmental tests, test reports, design operating loads and design static loads. These specifications shall be submitted for WADC review.

[redacted]

3. REQUIREMENTS: (Cont)

3.16.13 ⑰1 RELAYS: Relays shall be in accordance with applicable specifications and drawings, except that where special units are required they shall be subject to WADC approval. Relays shall be hermetically sealed where required due to danger of explosion or for operation at altitude.

3.16.14 BOOSTER COIL: Not applicable.

3.16.15 FILTERS: Filters shall be installed only where necessary to insure compliance with Specification No. MIL-I-6051. The type of filters used shall be as approved by WADC.

3.16.16 LOAD ANALYSIS: Electrical load analysis specifications MIL-E-7016 and MIL-E-7017 shall form a part of this specification.

[redacted]

3. REQUIREMENTS: (Cont)

3.16.13 ⑰① RELAYS: Relays shall be in accordance with applicable specifications and drawings, except that where special units are required they shall be subject to WADC approval. Relays shall be hermetically sealed where required due to danger of explosion or for operation at altitude.

3.16.14 BOOSTER COIL: Not applicable.

3.16.15 FILTERS: Filters shall be installed only where necessary to insure compliance with Specification No. MIL-I-6051. The type of filters used shall be as approved by WADC.

3.16.16 LOAD ANALYSIS: Electrical load analysis specifications MIL-E-7016 and MIL-E-7017 shall form a part of this specification.

[redacted]

3. REQUIREMENTS (Cont)

3.17 ELECTRONICS: The electronics equipment installed in this airplane shall consist of the complete integrated electronic and control system as developed and manufactured by Hughes Aircraft Company under AF Project MX-1179. The following communications, navigation and IFF components which will be included as part of Project MX-1179 shall be installed. The standard AF components will be modified as necessary by Hughes Aircraft Company to meet the requirements of the MX-1179 installation in this airplane. The equipment will be bench, preflight, and flight tested in accordance with test specifications to be prepared by Hughes Aircraft Company, and approved by the Air Research and Development Command. All of the components for the above equipments, with the exception of the antennas, pilot's indicator, instruments, and controls, shall be so installed in the electronics compartments that they are readily accessible for ground maintenance and adjustment. The Hughes Aircraft Company will be responsible for designing the MX-1179 system so that no one component of the system produces radio noise or interference with other components of the system. The aircraft contractor is responsible for eliminating any interference with the MX-1179 system which might be caused by other auxiliary equipment in the aircraft. The Contractor shall test the completed aircraft in accordance with Specification No. MIL-I-6051. All electronic equipment wiring shall be installed in accordance with Specification No. MIL-W-5088, except as otherwise noted in Appendix II. Wiring diagrams shall be submitted to the Hughes Aircraft Company and Headquarters, ARDC for approval. The installation requirements for the radar equipment, computer, and missile auxiliaries, which are also a part of the MX-1179 system, are covered under Section 3.18. The Contractor shall provide adequate cooling for the MX-1179 system. The cooling requirements shall be obtained from the Hughes Aircraft Company.

3.17.1 EQUIPMENT: Equipment equivalent to the following is included as part of the MX1179 system:

Radio set AN/ARC-34	UHF Command
UHF-D/F adapter AN/ARA-25	UHF Direction Finding
Omni-DME equipment AN/ARN-21	Tactical Omni-DME
Data link receiver and decoder	

[redacted]

3. REQUIREMENTS (Cont)

Radio receiving set AN/ARN-19	Omni-localizer
Radio receiving set AN/ARN-22	Glide path
Radar set AN/APN-71	Flare-out altimeter
Radar identification set AN/APX-19	IFF air-to-ground
Air-to-air IFF to include a transponder and interrogator-responser	
Intercommunication set AN/AIC-10	

Provisions shall be made in the MX-1179 system for the installation of a miniaturized AN/APN-34, DME equipment as alternate to the AN/ARN-21.

The radome shall be designed to meet the requirements of the Hughes Aircraft Company MX-1179 specification, which shall be submitted to the Contractor and WADC for approval. Development of this radome shall be a joint Contractor and Hughes responsibility.

3.17.1.1 CONTROL CONSOLE: Control console shall be provided in accordance with HIAD, except as specified in Appendix II.
(80)

3.17.1.2 ANTENNAS: The antennas shall be designed and installed in accordance with applicable Military specifications, and Hughes Aircraft Company specification, which shall be submitted to the Contractor and WADC for approval.

3.17.2 COMMUNICATION EQUIPMENT:

3.17.2.1 COMMAND SET AN/ARC-34:

3.17.2.1.1 The controls for the UHF communication equipment shall be installed on the left hand side of the pilot's cockpit as close to the power control as practicable.

[redacted]

3. REQUIREMENTS (Cont)

3.17.2.1.2 The antenna system shall be designed by the Contractor and shall, as a minimum, meet the performance requirements of Specification No. MIL-A-6224(USAF), and the requirements of Paragraph 3.17.1.2. Multiple antennas shall be installed, if necessary, to satisfy the above requirements.

3.17.2.2 LIAISON SET: Not applicable.

3.17.2.3 INTERPHONE: The necessary components or circuits of Intercommunications Set AN/AIC-10 shall be installed to provide for the use of Microphone M-32/AIC (oxygen mask) and Headset H-75/AIC (helmet). Provisions shall be made for ground interphone communication between the cockpit and the electronic equipment compartment.

3.17.24 MICROPHONE AND HEADSETS: Provisions for a microphone and headset shall be made in accordance with Paragraph 3.17.2.3. A microphone switch, Specification No. 32549, shall be installed on the throttle control.

3.17.2.5 FILTER EQUIPMENT: Not applicable.

3.17.2.6 RECORDING EQUIPMENT: Recording devices shall be included as part of the Hughes MX-1179 equipment for tactical and training use in recording sufficient data for mission evaluation.

3.17.3 NAVIGATION EQUIPMENT:

3.17.3.1 RADIO COMPASS: Not applicable.

3.17.3.2 MARKER BEACON EQUIPMENT: Not applicable.

3.17.3.3 INSTRUMENT APPROACH EQUIPMENT:

3.17.3.3.1 The localizer, omni-range and glide-path controls shall be installed on the right hand side of the cockpit.

[redacted]

3. REQUIREMENTS (Cont)

3.17.3.3.2 The glide-path antenna shall be designed by the Contractor and as a minimum, shall meet the performance requirements of Specification No. MIL-A-6325(USAF). The localizer VHF omni-range antenna shall be designed by the Contractor and as a minimum, shall meet the requirements of Specification No MIL-A-6300(USAF). It shall be designed and/or installed to meet the requirements specified in Paragraph 3.17.1.2.

3.17.3.4 ALTIMETER-RATIO:

3.17.3.4.1 The antenna for the flare-out altimeter shall be located on the underside of the fuselage near the center of gravity of the aircraft. It shall be designed and/or installed to meet requirements specified in Paragraph 3.17.1.2.

3.17.3.5 RADIO RANGE RECEIVER: Not applicable.

3.17.3.6 HOMING ADAPTER:

3.17.3.6.1 The controls for the UHF D/F equipment shall be located adjacent to other navigation controls on the right hand side of the cockpit.

3.17.3.6.2 The antenna shall be designed and/or installed to meet the requirements specified in Paragraph 3.17.1.2.

3.17.3.7 VHF NAVIGATION RECEIVER: See Paragraph 3.17.3.3.

3.17.3.8 DISTANCE MEASURING EQUIPMENT:

3.17.3.8.1 The controls for the Omni DME and alternate miniaturized DME shall be installed adjacent to other navigation controls on the right hand side of the cockpit.

3.17.3.8.2 The antenna for the tactical omni-DME and IFF equipment shall be designed and/or installed to requirements specified in Paragraph 3.17.1.2.

3.17.3.9 ARBITRARY COURSE COMPUTER: Not applicable.

[redacted]

3. REQUIREMENTS (Cont)

3.17.4 RADAR:

3.17.4.1 SEARCH EQUIPMENT: Not applicable

3.17.4.2 LORAN EQUIPMENT: Not applicable.

3.17.4.3 AUTOMATIC GROUND POSITION INDICATING EQUIPMENT: Not applicable.

3.17.4.4 IDENTIFICATION EQUIPMENT:

3.17.4.4.1 The controls for the IFF transponders shall be installed on the right hand side of the cockpit accessible to the pilot.

3.17.4.4.2 The antenna for the air-to-ground IFF shall be designed and/or installed to meet the performance requirements of Specification No. MIL-A-6543, and the requirements of Paragraph 3.17.1.2. More than one antenna will be used if found necessary to satisfy the requirements of the Omni-DME and IFF equipment which share this antenna system. (See Paragraph 3.17.3.8.2.)

3.17.4.4.3 The antenna for the X-band transponder for air-to-air identification shall be designed and installed to meet requirements specified in Paragraph 3.17.1.2. This antenna shall be developed by the Hughes Aircraft Company.

3.17.4.5 INTERROGATION EQUIPMENT:

3.17.4.5.1 The controls for the air-to-air interrogator responser shall be installed as specified by the Hughes Aircraft Company.

3.17.4.5.2 The interrogator-responser will use the radar antenna.

3.17.4.6 RADAR BEACON: Not applicable.

3.17.5 ELECTRONIC COUNTERMEASURE: Not applicable.

[redacted]

3. REQUIREMENTS (Cont)

3.17.6 ELECTRONIC GUIDANCE SYSTEM:

3.17.6.1 GUIDE LINKS AND SYSTEMS:

3.17.6.1.1 The antenna requirements for the data receiver are the same as those for the communications receiver (See Paragraph 3.17.2.1.2.)

3.17.6.2 TELEVISION AND TELEMETERING EQUIPMENT: Not applicable.

3.17.7 STATIC DISCHARGERS: Not applicable.

3.17.8 EMERGENCY RESCUE TRANSMITTER: Not applicable.

3.17.9 RADOME: A quickly detachable radome, in accordance with the requirements of Hughes Aircraft Company specification for the MX-1179 equipment, shall be provided in the nose of the fuselage to accommodate a radar antenna. The radome shall be de-iced as specified in Paragraph 3.20.2.1.

3.17.10 GROUND TEST EQUIPMENT OUTLETS: Two receptacles, Type AN3102-A-18-9S, shall be installed which will accept multiple test equipment plug arrangements provided by an available AF Type ground service cord.

[redacted]

3. REQUIREMENTS (Cont)

3.18 ARMAMENT:

3.18.1 DESCRIPTION: The armament installation shall consist of the specified aircraft rockets and guided missiles and related equipment.

3.18.2 FIXED GUNS: Not required.

3.18.3 ROCKETS AND MISSILES:

3.18.3.1 DESCRIPTION: The armament installation shall consist of MX-904 missiles and 2.75-inch rockets stored within the bays in the fuselage. The missile bays shall provide for alternate loading arrangements as specified in Paragraph 3.2.13.1.1. The rockets and missiles shall be fired automatically by the MX-1179 Electronic and Control System.

3.18.3.2 ROCKET LAUNCHER: The rocket launchers shall be an integral part of the missile bay doors which shall close flush with the fuselage contour when the launcher is in the retracted position. Means shall be provided for placing the rockets in firing position and for retracting the launcher to the closed position. A rocket firing contact shall be provided as a part of the rocket launcher to permit rocket firing when the launcher is in the extended position only.

3.18.3.3 MISSILE LAUNCHER: Means shall be provided for carrying six missiles within the fuselage. Actuators shall be provided to extend the missiles prior to launching and for retracting the launcher after launching. The missile bay doors shall be provided with a locking arrangement to lock the doors in the closed position. Means shall be provided to hold the doors open on the ground. With the doors open, it shall be possible to load the missiles onto the launchers. The missile dispenser shall be retractable with the missile in place for ease in loading. Provisions shall be made to automatically disconnect, when the missile is fired, the umbilical cord provided as a part of each missile to supply electronic power and signals from the MX-1179 Electronic and Control System for the missile electronic equipment.

[redacted]

3. REQUIREMENTS (Cont)

3.18.3.4 ALIGNMENT: The missiles shall be so aligned that, in the firing position, their axes will be fixed approximately two degrees down at the front with respect to the chord plane. The rockets shall be aligned approximately parallel to the chord plane in the firing position.

3.18.3.5 ARMAMENT CONTROLS:

3.18.3.5.1 The complete firing system shall be a part of the MX-1179 Electronic and Control System, except for the rocket firing intervalometer.

3.18.3.5.1.1 A manually-operated switch shall be provided for opening and closing the armament doors on the ground. Necessary switches of the momentary "On" type shall be provided in the missile bay area to reverse the missile dispenser for loading.

3.18.3.5.2 The MX-1179 Electronic and Control System shall include provision for checking the continuity of the rocket and missile firing circuits on the ground before armament installation.

3.18.3.5.3 A switch shall be provided to prevent inadvertent firing of the missiles or rockets when the landing gear is in the extended position.

3.18.4 FLEXIBLE GUNS: Provisions for flexible guns are not required.

3.18.5 STORES: Provisions for stores are not required.

3.18.6 PASSIVE DEFENSE:

3.18.6.1 WINDSHIELD ARMOR GLASS: Windshield armor glass shall not be less than three-fourths inch thick. All armor shall be an integral part of the windshield. The glass shall be in accordance with Specification No. AN-DD-G-551, except for whatever modification may be necessary to incorporate electrical anti-icing provisions.

3.18.6.2 ARMOR PLATE: Not required.
(81)

3.18.6.3 CONE OF FIRE PROTECTION: Cone of fire protection for the pilot will be that area afforded by the armor glass and mass of electronic equipment located in front of the pilot.
(81)

[redacted]

3. REQUIREMENTS (Cont)

3.19 FURNISHINGS AND EQUIPMENT:

3.19.1 ACCOMMODATIONS FOR PERSONNEL:

3.19.1.1 (82) An ejection seat shall be installed for the pilot. The seat shall include provision for attachment and use of a Type B-18 lap-type safety belt and a Type G-3 shoulder harness. The seat shall accommodate the pilot wearing the emergency rescue equipment specified in Paragraph 3.19.6.

3.19.1.2 A pressure regulating valve AN6538-1 for anti-g suit shall be installed in accordance with Specification No. MIL-I-7890.

3.19.2 MISCELLANEOUS EQUIPMENT:

3.19.2.1 Deleted.

3.19.2.2 (157) An instrument panel shall be provided forward of the pilot for the flight and engine instruments specified in Paragraph 3.14.1. The instrument panel shall be in accordance with Specification No. MIL-I-5997, except for deviations noted in Appendix II.

3.19.2.3 Deleted.

3.19.2.4 (84) A combination flight report holder, map and data case shall be provided.

3.19.2.5 (123) An airplane check list holder shall be provided. The check list shall conform to Specification No. 40149.

3.19.2.6 Compressed air windshield cleaners shall be installed.

3.19.2.7 Provisions for food and drinking water are not required.

3.19.2.8 Provisions for pyrotechnics are not required.

[redacted]

3. REQUIREMENTS (Cont)

3.19.3 FURNISHINGS:

3.19.3.1 Thermal and acoustical insulating materials shall be provided in accordance with Specification No. MIL-S-6144.

3.19.4 EMERGENCY EQUIPMENT: Fire detection and overheat warnings shall be provided for the engine accessory and burner compartments with indicators on the pilot's instrument panel. Fixed fire extinguishers are not required. Portable and hand-type extinguishers are not required.

3.19.4.1 A temporary installation of a fixed fire extinguisher system shall be made on each of the two prototype YF-102 airplanes only, utilizing armament compartment spaces as necessary to house bottles of extinguishing agent. This installation shall be in accordance with Specification MIL-E-5352 insofar as practicable.

3.19.5 (150a) (150b) OXYGEN EQUIPMENT: A low-pressure oxygen system shall be provided in accordance with Specification No. MIL-I-5585A, except as noted in Appendix II.

3.19.6 EMERGENCY RESCUE EQUIPMENT: The emergency rescue equipment for the pilot shall consist of a seat-type survival kit and back-type parachute having dimensions of 15 x 25 x 7 inches. First aid kit, knife, emergency sustenance kit and anti-exposure suit are not required.

[redacted]

3. REQUIREMENTS: (Cont)

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT:

3.20.1 ㊴ thru ㊹ AIR CONDITIONING: Cabin pressurization and air conditioning shall be obtained from engine compressor bleed air cooled in two stages. In the first stage this air shall be cooled with a ram air fed heat exchanger. Subsequent expansion of this air through an air turbine motor shall provide the second stage of cooling. The heat exchanger shall be employed to control the final air temperature, and the power extracted in the turbine expansion process shall be utilized to generate alternating and direct current electrical power and drive the pneumatic system air compressor. The electrical power produced shall supply the needs of the MX-1179 and the basic airframe electrical requirements. Frequency regulation required shall be obtained by speed regulation of the air turbine motor. The shaft loading on the expansion turbine shall always be sufficient to insure adequate flow and pressurization for the cockpit. In emergencies, ram air shall be ducted into the cockpit for air conditioning. The Contractor shall provide adequate cooling for all parts of the airplane such that the function and/or service life of no item on the airplane shall be appreciably impaired due to overheating. High temperature limits given in the applicable specifications of equipment and material items may be exceeded for a maximum duration of five minutes during flight.

3.20.1.1 IN-FLIGHT AIR CONDITIONING:

3.20.1.1.1 OCCUPIED COMPARTMENTS: Air for pressurizing, heating, cooling and ventilating the cabin shall be as specified in Paragraph 3.20.1. The maximum operating pressure differential shall not exceed 5 psi. An Altitude versus Pressure schedule is shown on Figure 4, page 58.

3.20.1.1.2 OTHER COMPARTMENTS:

3.20.1.1.2.1 ROCKET AND MISSILE BAY: Conditioned air shall be supplied to the rocket and missile bay areas to maintain the rocket and missile temperature between 0° and 130°F.

[redacted]

3. REQUIREMENTS (Cont)

3.20.1.1.2.2 ELECTRONIC EQUIPMENT BAYS: Cooling air shall be supplied to the electronic equipment bays. Cooling air required shall be as necessary to insure satisfactory operation of the equipment.

3.20.1.1.2.3 MISCELLANEOUS COMPARTMENTS: Cooling air shall be provided by means of ram air or cockpit discharge air for the following compartments: Nose wheel well, engine accessories compartment, engine tail section compartment, and the compartment containing the electrical power supply and refrigeration equipment.

3.20.1.2 GROUND AIR CONDITIONING:
㉒ ㉕

3.20.1.2.1 OCCUPIED COMPARTMENTS: On the ground, with the canopy closed, the pilot's compartment shall be conditioned by means of air bled from the compressor section when the engine is in operation. When the engine is not in operation, the conditioned air shall be provided by the auxiliary power plant described in Paragraph 3.13.

3.20.1.2.2 OTHER COMPARTMENTS:

3.20.1.2.2.1 ROCKET AND MISSILE BAY: The missile and rocket temperatures shall be maintained between 0° and 130°F on the ground using the same air sources specified in Paragraph 3.20.1.2.1.

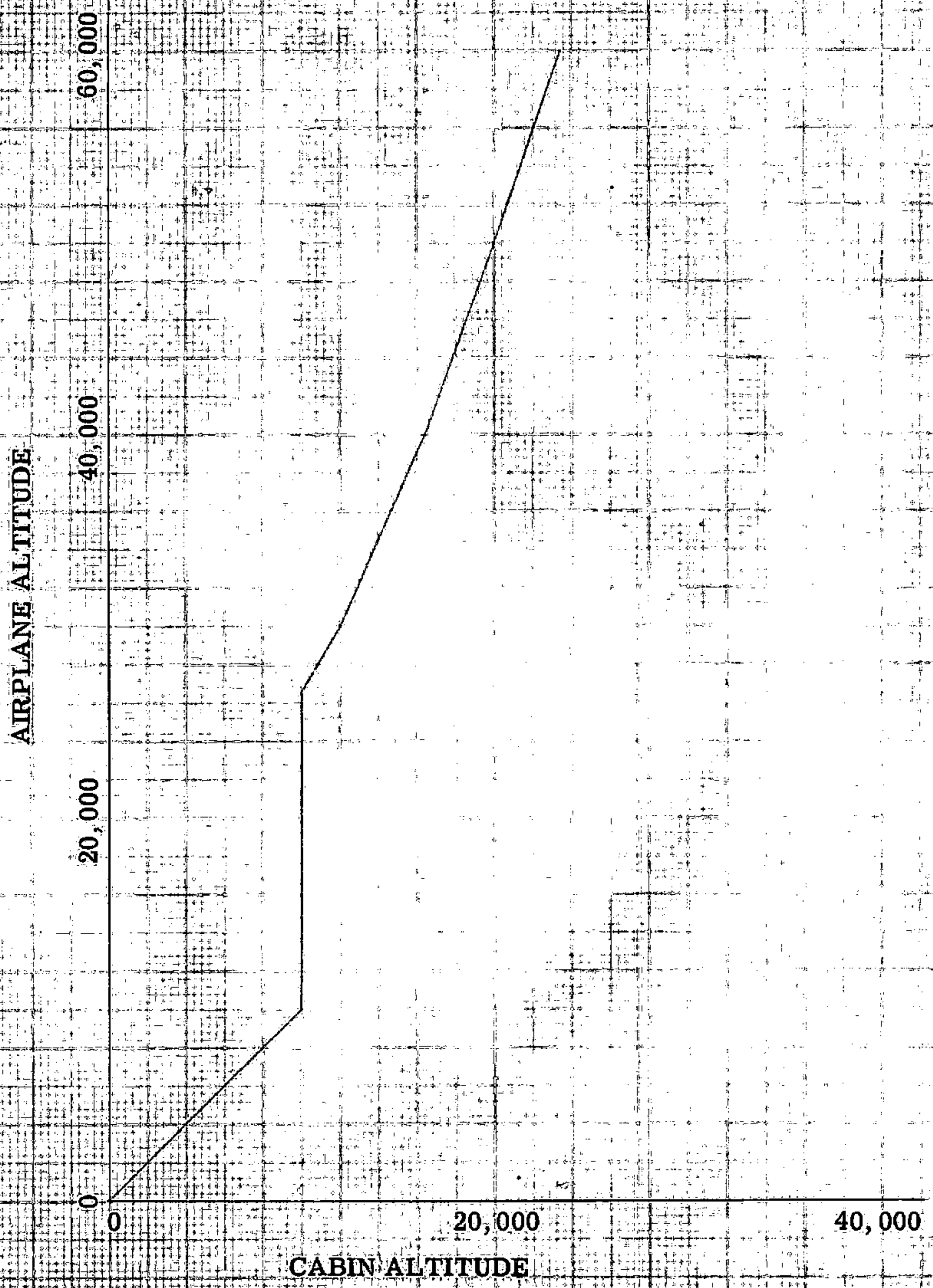
3.20.1.2.2.2 ELECTRONIC EQUIPMENT BAYS: On the ground the electronic equipment bays shall be cooled as necessary to insure satisfactory operation of the equipment using the same air source as specified in Paragraph 3.20.1.2.1.

3.20.2 ANTI-ICING:

3.20.2.1 ANTI-ICING OF NONTRANSPARENT AREAS: The wing and tail leading edges and engine air intake duct lips shall have provisions for anti-icing by means of engine bleed air. The specified engine includes build-in anti-icing protection. The radome shall be de-iced by freezing point suppressant liquid spray system. This anti-icing liquid shall be a special load item. Anti-icing shall be in accordance with Specification No. 40395-C, except as noted in Appendix II.
(124)
thru
(130)

[redacted]

CABIN PRESSURIZATION SCHEDULE



[redacted]

FIGURE 4

[redacted]

3. REQUIREMENTS (Cont)

3.20.2.2 ANTI-ICING, DEFROSTING AND DEFOGGING OF TRANSPARENT AREAS: Those portions of the windshield through which visibility is required for landing and use of the optical sight shall have provisions for anti-icing. All inner surfaces of transparent areas of the cockpit enclosure shall be defrosted and defogged. These provisions shall be in accordance with Specification No. MIL-T-5842, except as noted in Appendix II.

(151)
(152)

3.21 PHOTOGRAPHIC: Not required.

[redacted]

3. REQUIREMENTS (Cont)

3.22 AUXILIARY GEAR: Auxiliary gear shall include provisions for towing jacking, mooring, hoisting and leveling.

3.22.1 TOWING PROVISIONS:

3.22.1.1 MAIN LANDING GEAR: Tow lugs, or equivalent, with an inside diameter of not less than 2 inches shall be provided to permit attachment of a tow bar or cable for towing the airplane forward or backward.

3.22.1.2 NOSE LANDING GEAR: A hollow nose wheel axle with an inside diameter of 3/4 inch shall be provided to permit attachment of a tow bar for towing the airplane forward or pushing backward. An alternate arrangement in which an inside diameter of 3/4 inch extending one inch inboard from each outer face of the axle will be acceptable.

3.22.2 (89) (89a) JACKING PROVISIONS: Provision shall be made to jack the airplane as required by the HIAD. The provisions shall be in accordance with Specification No. AN-J-5(2), except as specified in Appendix II. Fuselage jack pads shall incorporate mooring provisions and shall be recessed wherever possible.

3.22.3 ㉘ MOORING PROVISIONS: Provision shall be made to moor the airplane in accordance with the requirements of the HIAD, except as specified in Appendix II. Fuselage mooring lugs or rings shall be integral with the fuselage jack pads, and/or attached to a common fitting and shall be recessed wherever possible.

3.22.4 ㉔ HOISTING PROVISIONS: Provisions shall be made for hoisting the airplane and components in accordance with the requirements of Specification No. MIL-S-5944.

3.22.5 LEVELING: Leveling provisions consisting of two sets of leveling lugs, and a two jig point arrangement for measuring in accordance with Specification No. MIL-M-6756 shall be provided.

[redacted]

3. REQUIREMENTS: (Cont)

3.22.6 COVERS AND SHIELDS: Covers and/or shields for air scoop and exhaust openings, transparent glass and enclosures, wing, tail, and miscellaneous openings, conforming to Specifications No. MIL-C-5778, MIL-C-5462 and MIL-S-6451, as applicable, shall be furnished as specified in the aircraft procurement contract.

3.22.7 SPECIAL GROUND SUPPORT EQUIPMENT: Special ground support equipment, when required, shall conform to Specification AN-D-17, and shall be furnished as specified in the aircraft procurement contract.

The airplane and its components shall be designed to require a minimum quantity of support equipment for normal maintenance, replacement of parts, or for servicing.

[redacted]

4. SAMPLING, INSPECTION AND TEST PROCEDURES:

4.1 The method of inspection and tests shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

5. PREPARATION FOR DELIVERY:

5.1 Preparation for delivery shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

[redacted]

6. NOTES:

6.1 EXPLANATORY INFORMATION: See applicable data, Appendix III.

6.2 ADDITIONAL INFORMATION: See applicable data, Appendix III.

6.3 DEFINITIONS: Where the phrases "complete provision for", "structural provision for" and "space provision for" are used, the intent is defined as follows:

6.3.1 COMPLETE PROVISION FOR: "Complete provision for" a specific item of equipment, or assembly or installation, shall mean that all supports, brackets, tubes and fittings, electrical wiring, hydraulic lines, etc., are to be installed and adequate weight and space allocated so that the equipment can be installed without alteration to the specified equipment or the airplane, and that no additional parts are required for installation, other than the item itself. Standard stock items such as nuts, bolts, cotter pins, etc., need not be furnished.

6.3.2 STRUCTURAL PROVISIONS FOR: "Structural provisions for" a specific installation shall mean that the primary structure will be structurally adequate for the installation, but that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be required. Structural provisions also include weight of the equipment involved as an element of alternate weight.

6.3.3 SPACE PROVISIONS FOR: "Space provision for" a specific installation shall mean that space only shall be allocated for the installation, and that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be required. "Space provision for" does not imply that adequate attaching structure is provided, unless otherwise stated in each instance.

6.3.4 OTHER DEFINITIONS: Definitions of the HIAD, NACA Technical Report No. 474, and Specification No. MIL-I-6252(USAF) are considered applicable to the airplane described herein.

[redacted]

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

LANDING GEAR (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
1	1	Casings; Nose Gear, 24 x 5.5, Type VII EHP (12 PRN)	41-7831	21.0
2	1	Tube; Nose gear, 24 x 5.5, Type VII EHP fabric base	41-7832	4.6
3	1	Wheel Assembly; Nose gear	41-7830	18.4
4	2	Casings; Main gear, 30 x 8.8, Type VII EHP (14 PRN)		89.2
5	2	Tubes; Main gear, 30 x 8.8, Type VII EHP, fabric base	41-1687	16.8
6	2	Wheel Assemblies, Main gear		86.6
7	2	Brake Assemblies, Main gear		169.4

POWER PLANT (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
1	1	Engine; Turbo-jet, including afterburner P & W (dry), J57-P-11		4825.0
2	1	Starter, Low Pressure Air, Hamilton Standard, Type M-3		36.0

POWER PLANT (Ground Equipment)

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
1	1	Gas Turbine Compressor (Model 140)		240.0

[redacted]

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No	Total Wt (Lb)
		INSTRUMENTS (Weight Empty)		
1	2	Indicator; Hydraulic Pressure 0-4000 psi, MIL-I-7084, MS-28010-5	61-1456	1.2
2	2	Transmitters; Hydraulic Pressure, MIL-T-7113 MS-28005-5	61-1455	2.8
3	1	Indicator; Oil Pressure, 0 - 100 psi, MIL-I-7086	61-3121	0.6
4	1	Transmitter; Oil Pressure, 0 - 100 psi, MIL-T-5796	61-3005	1.3
5	1	Indicator; Tachometer, MS28000-1 Specification MIL-I-5573A	61-222	1.0
6	1	Generator; Tachometer, AN5544-3	61-8710	2.9
7	1	Indicator; Turbine outlet temperature, MIL-I-7076	61-8829	1.0
8	1	Clock; 1-7/8" dial, AN5743-1A	60-1200	0.4
9	1	Altimeter; Aircraft, 0 - 80,000 feet, AN5760-5, MIL-A-6863	60-602	1.5
10	1	Altimeters; Cabin Pressure, 0 - 50,000 feet, MIL-I-5099	60-603	.5
12	1	Indicator; Combination Air Speed and Machmeter, Type P-2, MCREXE-42-123......		1.5
13	1	Indicator; Attitude Gyro, Type J-8, MIL-I-5133A	60-5933	3.3
14	1	Indicator; Bank and Turn, MIL-I-7627		1.6
15	1	Indicator; Rate of Climb, ±6,000 ft/min, AN5825-7, MIL-I-7721		1.8
*16	1	Transmitter; Pneumatic Pressure, Type V MIL-T-5483		1.4

*CFAE for first nine airplanes - GFAE for tenth airplane and on.

[redacted]

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
		INSTRUMENTS (Weight Empty) (Cont)		
*17	1	Indicator; Pneumatic Pressure, 1-1/2" dia Type I, MIL-I-6856 Dwg B/A 51A11A1		.6
18	3	Indicators; Landing Gear Position, AN5839-1 , MIL-I-6839	60-3170	.6
19	1	Voltmeter; Alternating Current, 0 - 250 volts, Type C-2, 32499	61-9750	.4
20	1	Loadmeter; Direct Current, -0.1 to +1.25, Type J-1, 32529A	61-700	.4
21	4	Gages; Hydraulic Pressure, 0 - 5000 psi, AN5771-T7A	61-2355	2.0
22	1	Remote Compass, Type J-2, Consisting of:		
	1	Control; Directional, Electric-Driven Gyro, Type S-3A, MIL-C-6231A	60-1480	7.0
	1	Amplifier; Single Channel Integral, Slaved Gyro Magnetic Compass, Type A-2, 21125A	60-1702	8.0
	1	Transmitter; Remote Compass Unstabilized, Type C-2, 27635	60-1483	1.1
	1	Compensator; Transmitter, Slaved Gyro Compass, 27635	60-1479	
23	1	Indicator; Ice Warning		.2
*24	1	Indicator; Fuel Flow, Type A-19, MIL-I-6599		.8
*25	1	Transmitter; Fuel Flow, Type J-6, MIL-T-6598		7.0

* CFAE for first nine airplanes - GFAE for tenth airplane and on.

[redacted]

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

ELECTRICAL (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
1	1	Battery; Storage, Shielded, 24-Volt, 36-Amp-Hr AN3150-2	42-375	77.0
2	1	Inverter; Instrument, Class A, 100VA, 3-Phase AN3499-1	42-2310	6.5

ARMAMENT-GUNNERY (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
1	1	Set Electronic and Control System; MX-1179 Hughes		1187.4

ARMAMENT-ORDNANCE (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
1	1	Canopy Remover; M1A2, Consisting of	93-352	4.4
	1	Canopy Remover Cartridge, M29A2		
	1	Canopy Remover Initiator		
	1	Canopy Remover Exactor		
2	1	Personnel Ejection Catapult; T4E4, Consisting of	93-321	14.5
	1	Personnel Ejection Cartridge, M28A1		
	1	Personnel Catapult Initiator		

MISCELLANEOUS
FURNISHING & EQUIPMENT (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
1	1	Belt; Lap Safety, Type B-18, 51H3977-1	45-1706	2.9
2	1	Harness; Shoulder, Type G-3, 50D3772	45-2433	0.9
3	1	Valve, Regulating, Anti "G" Suit, AN6538-1	48-9065	3.5

[redacted]

APPENDIX I-B

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - - GOVERNMENT INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt (Lb)
		ARMAMENT (Design Useful Load)		
1	24	Rockets; Aircraft, Folding-Fin, 2.75" FFAR		432.0
2	6	Missiles; Air-To-Air (including launchers) Hughes MX-904		810.0
		MISCELLANEOUS (Useful Load)		
1	1	Personnel Parachute; Back-Type (size 15 x 25 x 7 inches)		20.0
2	1	Survival Kit; Seat-Type		18.0
		MISCELLANEOUS (Special Load)		
1	3 gal	Anti-Icing Fluid, Radome		27.0

[redacted]

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

LANDING GEAR (Weight Empty)

Item No.	Qty	Description	Identification
1	1	Shock Strut - Nose Landing Gear	
2	2	Shock Struts - Main Landing Gear	

POWER PLANT (Weight Empty)

Item No.	Qty	Description	Identification
1	2	Pumps; Fuel Booster, Electric Motor-Driven .	
2	1	Air Oil Cooler	

[redacted]

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

PNEUMATIC (High Pressure) AND HYDRAULIC SYSTEM (Weight Empty)

Item No.	Qty	Description	Identification
1	2	Pumps; Hydraulic, Engine-Driven Variable Volume (Spec MIL-P-7740)	Vickers AA-60652-L
2	1	Pump; Hydraulic, Air-Driven (Spec MIL-P-5994; CVAC Spec ZM-8-017)	
3	2	Accumulators; 3000-psi Hydraulic	
4	2	Valves; Surface Control	
5	2	Valves; Power Brake	
6	3	Valves; Landing Gear	
7	1	Valve; Speed Brake	
8	4	Valves; Armament Actuation	
9	7	Valves; Relief	
10	1	Valves; Air Snubber	
11	1	Valve; Relief (Air)	
12	1	Valves; Selector (Hydraulic Motor -Alternator-Generator Drive)	
13	AR	Valves; Check and Restrictor	
14	1	Valve; Lateral Accel Control	
15	1	Valve; Emergency Landing Gear	
16	1	Valve; Master Brake	
17	1	Valve; Nose Gear Steering	
18	1	Valve; Flow Control	
19	4	Cylinders; Elevon Actuating	
20	1	Cylinder and Valve Rudder Actuating	
21	3	Cylinders; Speed Brake Actuating	
22	2	Cylinders; Main Landing Gear	
23	1	Cylinder; Nose Landing Gear	

[redacted]

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification
		PNEUMATIC (High Pressure) AND HYDRAULIC SYSTEM (Weight Empty)	
24	1	Cylinder; Nose Landing Gear Door	
25	6	Cylinders; Armament Displacement Mechanism Actuating	
26	18	Cylinders; Armament Doors	
27	1	Cylinder; Canopy Unlatching	
28	1	Cylinder; Emergency Hyd Pump Displacing	
29	2	Filters	
30	2	Switches; Pressure	
31	8	Quick Disconnects	
32	1	Cooler; Oil (hydraulic) Dual	
33	1	Compressor; 3000 - psi Air (Spec MIL-C-6591). . .	
34	4	Flask; Air (3000 psi).	
35	2	Regulator; Reservoir Pressure (Air).	
36	1	Pressure Regulator and Relief Valve (1500 psi Air)	
37	1	Pressure Regulator (1000 psi Air).	
38	1	Pressure Regulator (200 psi Air).	
39	1	Pressure Regulator (Compressor Absolute)	
40	1	Motor; Hydraulic (Alternator Drive)	
41	1	Separator; Water (Mechanical)	
42	1	Separator; Water (Chemical)	

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification
		ELECTRICAL (Weight Empty)	
1	1	Transformer; 200/115-Volt, 3-Phase GE#70G253)	
2	1	Transformer; 115/26-Volt, 1-Phase (Pioneer #DW-73-0)	
3	1	Receptacle; External Power, 28-Volt, Direct Current with Shield	AN2552-A3A
4	1	Receptacle; External Power, 115/200 Volt, Alternating Current, 3-Phase	AN3114-2A
5	1	Signal; Warning, Type J-2	32462
6	1	Flasher; Position Light, Type C-2	32660
7	2	Light Assemblies; Tail Position, White	Special Design
8	2	Light Assemblies; Tail Position, Yellow	Special Design
9	2	Light Assemblies; Top and Bottom Fuselage (two lamp) without Lamps	Special Design
10	2	Lamps; Incadescent, Single-Contact Bayonet Candelabra, G-6 Bulb, 28-Volt, 6 cp (for top and bottom fuselage lights)	AN3131-303
11	1	Taxi Light; 150 Watts - PAR 46	GE4570-
12	AR	Fixtures; Light, for Individual Instruments	MIL-F-5057
13	AR	Lamp Assemblies; Cockpit, Fixed Red	
14	AR	Switches	MIL-S-6745
15	AR	Circuit Breakers; MS25003, MS25004, MS25005, MS25006	MIL-C-5809
16	AR	Light Assemblies; Press-To-Test Indicator AN3157	AN-L-34
17	2	Light Assemblies; Wing Tip	Special Design
18	1	System; Cabin Temperature Control	
19	1	System; NESA Control	
20	AR	Lights; Thunderstorm	
21	2	Light, Landing PAR 46-250 Watts	AN3147-1

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

Item No.	Qty	Description	Identification
		ELECTRICAL (Weight Empty)	
22	1	Intervalometer; Rocket Firing (Convair Spec ZM-8-019)	
23	2	Lamps - Incadescent S-11 Bulb (Top and Bottom of Fuselage)	AN3133-311
24	1	Intervalometer; Missile Firing	
25	1	Generator; 30-Volt 75 Amp Direct Current (Convair Spec ZM-8-005)	
26	1	Generator Control, Direct Current - Type B-3	
27	1	AC Generator; 120/208-Volt, 3-Phase - 12KVA (Convair Spec ZM-8-005)	
28	1	Control; AC Generator, 3-Phase - Exhibit WCEEE-1-22	
29	1	AC Generator; 1000VA, 115-Volt, Single Phase (Convair Spec ZM-8-028)	
30	1	Control; AC Generator, Single Phase (Convair Spec ZM-8-028)	
31	1	Transformer-Rectifier (Convair Spec ZM-8-027)	
		ELECTRONIC (Weight Empty)	
1	1	Radome	

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

FURNISHINGS AND EQUIPMENT (Weight Empty)

Item No.	Qty	Description	Identification
1	1	Ejection Seat Assembly	
2	1	Ejection Seat Tracks	
3	1	Hose, Anti "G" Suit	52B3687-2
4	1	Hose, Anti "G" Suit	52B3687-1
5	1	Connector Assembly, Anti "G" Suit	AN6532-1
6	1	Brake Parachute	
7	1	Holder; Card, Air Speed Correction	
8	1	Card; Air Speed Calibration, Type AF21-E	

OXYGEN EQUIPMENT (Weight Empty)

Item No.	Qty	Description	Identification
1	1	Regulator, Oxygen, Type D-1 (Modified to incorporate plastic panel)	MIL-R-6352
2	3	Cylinder, Oxygen, Type D-2	MIL-C-5887
3	1	Tubing, Oxygen Mask-To-Regulator	AN6003-24A
4	1	Tubing, Oxygen Mask-To-Regulator	AN6003-T12A
5	1	Valve, Oxygen Filler	AN6024-6
6	2	Valve, Oxygen Check, Style H	AN6037-1
7	1	Valve, Oxygen Check, Style G	AN6036-1
8	1	Valve, Oxygen Check, Style E	AN6034-1

FIRE DETECTION (Weight Empty)
(Edison Continuous Cable System)

Item No.	Qty	Description	Identification
1	2	Panels	
2	2 Sets	Cables	

[redacted]

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

FURNISHINGS AND EQUIPMENT (Special Load)

Item No.	Qty	Description	Identification
1	1	View-Limiter, Pilots Enclosure	

PNEUMATIC (Low Pressure), AIR CONDITIONING AND ANTI-ICING SYSTEMS (Weight Empty)

Item No.	Qty	Description	Identification
1	1	Air Turbine Motor, Gear Box and Heat Exchanger (refrigeration and accessory drive unit)	
2	1	Actuator; Heat Exchanger Exit Flap	
3	1	Humidifier	
4	1	Valve; Flow Control (Aft Elect Bay)	
5	1	Valve; Check 3-1/2" Stl (G.T.C. Conn)	
6	1	Valve; ATM Shut-Off	
7	1	Valve; Check, Ram Air, 5" Alum	
8	1	Valve; Armament and Electric Cooling	
9	1	Valve; Shut-Off, Ejector Pump (2" Stl)	
10	1	Valve; Defog Selector	
11	1	Valve; Cabin Dump	
12	1	Valve; Cabin By-Pass	
13	1	Valve; Cabin Auxiliary Heat	
14	1	Valve; Cabin Canopy Check and Restrictor	
15	1	Valves; Check 3-1/2" Stl (Bleed Air)	
16	1	Valve; Check 4" Alum (Cabin Pressure)	
17	1	Valve; Canopy Seal Selector	
18	1	Valve; Pressure Relief, Anti-Icing	

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - - CONTRACTOR INSTALLED

Item No	Qty	Description	Identification
		PNEUMATIC (Low Pressure), AIR CONDITIONING AND ANTI-ICING SYSTEMS (Weight Empty)	
19	2	Valves; Shut-Off, Anti-Icing	
20	1	Valve; Glycoltank	
21	1	Regulator; Cabin Pressure	
22	1	Fitting; Cabin Pressure Test	
23	1	Fitting; Canopy Test	
24	1	Tank; Water	
25	1	Tank; Glycol	
26	1	Pump - Ejector (H.E. Exhaust)	
27	1	Limiter; Engine Bleed Air Flow	
28	5	Limiter; Anti-Icing Air Flow	
29	1	Cap; GTC Conn	
		INSTRUMENTS (Weight Empty)	
1	1	Fuel Quantity System; MIL-G-7818	
2	1	Tube - Pitot Static	Special Design

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1, Handbook of Instruction for Aircraft Designers, Ninth Edition, Including Revisions up to and including 1 April 1950.
1	3.1.6	Dimensions and General Data

Requirement: Paragraph 0.17 - Dimensions (maximum of aircraft parts) "For aircraft whose ferry range is less than 3,000 miles, the design shall be such that the aircraft may be readily disassembled and packed for shipment by rail and ocean borne carrier. Since there are limitations in the size of container which can be transported by surface carrier, all components should be designed to fall within those limitations. The importance of providing suitable fastenings, bearing surfaces, etc., for use in shipment of components and spare parts should be recognized in their design. Whenever it is possible, without unduly compromising design, the disassembled parts of the aircraft shall be of suitable dimensions for packaging in containers of minimum excess cubage."

Deviation: Consideration need not be given in the design for disassembly of the airplane for shipment nor for limitation of dimensions expressly for this purpose.

Reason for Change and Remarks: This airplane has a ferry range closely approaching the required 3,000 miles which the Contractor considers ample for ferrying anywhere using existing facilities.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

2 3.4 Structural Design Criteria

Requirement: Paragraph 3.1 - "The stress analysis criteria shall be as set forth in Specification No. C-1803. This document is classified Confidential".

Deviation: The structural criteria shall be as indicated in Contractor's report ZU-8-003, "F-102 Stress Analysis Criteria", in lieu of AF Spec C-1803-3 and R 1803-1 through R-1803-10. The Contractor's report shall be subject to approval of WADC.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range, and purpose of the aircraft.

* * * *

3 Deleted.

4 3.4 Structural Design Criteria

Requirement: Paragraph 4.102 - "Detailed measures required by the Air Materiel Command for avoiding flutter together with the data to be submitted, are listed in Specification No. 1817. It will generally be found advantageous to construct the prototype aircraft using a conservative approach to flutter prevention such as complete compliance with the detail requirements of the specification."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554, Aeroelastic Calculations" which is subject to WADC approval.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

3.4 Structural Design Criteria (Cont)

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

5 3.4 Structural Design Criteria

Requirement: Paragraph 4.112 - "The requirements for the prevention of control surface lift reversal are contained in Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks; To clarify specification requirements and to indicate method of complying with this specification.

* * * *

6 3.4 Structural Design Criteria

Requirement: Paragraph 4.122 - "Requirements for the desired margin of safety against airfoil divergence are contained in Specification No. 1817."

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
6	3.4	Structural Design Criteria (Cont)

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

7 3.4 Structural Design Criteria

Requirement: Paragraph 4.22 - "There are no detail requirements for for the prevention of buffeting. However, aircraft shall be free from buffeting over the entire permissible speed range except that buffeting may be acceptable as a stall warning if it occurs at a speed not exceeding 10 mph above the stalling speed."

Deviation: The airplane shall be free from objectionable buffeting over the entire permissible speed range.

Reason for Change and Remarks: No definite stall point exists.

* * * *

8 3.4 Structural Design Criteria

Requirement: Paragraph 4.41 - "The structural vibration survey shall be conducted in accordance with the requirements of ANC Bulletin ANC-12".

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
8	3.4	Structural Design Criteria (Cont)

Deviation: The requirements of Bulletin ANC-12 shall be as outlined in Contractor's Reports No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations", and ZU-8-002 "Outline of MX-1554 Vibration Tests" both of which are subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

Deviation	Paragraph	
9	3.4	Structural Design Criteria

Requirement: Paragraph 5.43 - "Requirements for flutter prevention of such devices as dive brakes, dive pull-out flaps, spoilers, scoops, etc., are given in AAF Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

10 3.4 Structural Design Criteria

Requirement: Paragraph 5.441 - "The requirements for the static balance of control surfaces to prevent flutter are given in Specification 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of MX-1554 Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

11 3.4 Structural Design Criteria

Requirement: Paragraph 5.442 - "The requirements for dynamic balance of control surfaces and the calculations involved in determining dynamic balance may be found in Chapter 4, Flutter, Vibration and Noise, and AAF Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall be as outlined in Contractor's Report No. ZU-8-001 "Outline of Aeroelastic Calculations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Continued)
12	3.4	Structural Design Criteria

Requirement: Paragraph 6.120 - " Rigid structure shall be provided to support the crew members at all ditching stations for the load factors specified in Specification No. R-1803-5."

Deviation: Refer to Deviation No. 2.

Reason for Change and Remarks: Same as for Deviation No. 2.

* * * * *

Deviation	Paragraph	AMC Manual 80-1 (Continued)
12a	3.7.1.3.6	Pilot's Windshield

Requirement: (a) Paragraph 6.21 - "Flat panels in those areas used for vision in taking-off, flying, aiming guns, and landing should be placed at an angle of incidence no greater than 55° if Type I, Grade A, glass, or plastic of equivalent optical properties, is used."

(b) Paragraph 6.213 - "The design of transparent sighting areas shall be such that the theoretical variation in sight line deviation around the average sight line deviation over The entire area shall not be greater than ±0.5 mil."

Deviation: (a) The true angle of incidence may be 75°.
(b) The sight line deviation may be 6 mil. maximum.

Reason for Change and Remarks: A flat windshield installed to HIAD requirements results in severe performance penalties at supersonic speeds. A sloping "V" windshield has been found to offer the best supersonic high speed performance. The sloping "V" windshield of the F-102 results in high incidence angles with resultant sight line deviations. (At 75° incidence the deviation through glass is approximately 7 times as great as at 0° incidence). The "V" windshield also requires vision through the margins of the glass for gun sighting. With present glass lamination manufacturing

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Continued)

12a Reason for Change and Remarks: (Continued)

procedures, deviations through the margins of glass panels is approximately twice that obtained one (1) inch from the edge.

* * * * *

13 3.7.1.3.1 Pilot's Compartment

Requirement: Paragraph 6.415 - (1) "All aircraft shall be equipped with instrument-flying inclosures that can be opened and closed in flight." (2) "The inclosures for single-seat aircraft shall be equipped with an automatic release." (3) "Instrument-flying inclosures are, in general, of two types; the hood type...., and the two-color combination view-limiter type. The first type will be habitually used on aircraft with single or tandem cockpits."

Deviation: (1) The instrument-flying inclosure will not be of a type which permits opening and closing in flight. (2) An automatic release shall not be required. (3) The instrument-flying inclosure shall be the two-color combination view-limiter type. (4) The airplane performance may be limited for blind flying practice.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
13 (Cont)	3.7.1.3.1	Pilot's Compartment

Reason for Change and Remarks: (1) The configuration of the cockpit and pilots windshield precludes the possibility of the instrument-flying inclosure being readily opened and closed in flight and of providing an automatic release. (2) An automatic release is not required for single-seat aircraft using two-color combination view-limiter type inclosure. (3) WADC has indicated their desire to use the two-color combination view-type flying - inclosure on this airplane. (4) High performance of this aircraft would create high temperatures near the glass surfaces that would damage the acetate sheet material of the flying inclosure.

* * * *

14 3.8.3 Auxiliary Landing Gear

Requirement: Paragraph 7.10 - "Any aircraft equipped with a tricycle gear shall be provided with a tail skid or buffer...."

Deviation: A tail skid or buffer shall not be required.

Reason for Change and Remarks: To save weight plus experience with the XF-92 airplane indicates that a tail skid or buffer is not necessary.

* * * *

15 3.8.2.3 Tires and Tubes - Main Landing Gear

Requirement: Paragraph 7.221 - "In the selection of main wheel tires the maximum alternate gross weight shall be considered to be divided equally between the main wheels with no allowance being made for loads being carried by the auxiliary wheel."

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
15 (Cont)	3.8.2.3	Tires and Tubes - Main Landing Gear

Deviation: In the selection of main wheel tires the maximum alternate gross weight shall be considered to be divided among the nose and main wheel tires in accordance with their respective static reactions.

Reason for Change and Remarks: It is the Contractor's understanding that this method of tire rating is approved by the CAA and is currently being considered for approval by the USAF. Weight saving of 8 pounds per airplane over 16 ply tire required to meet the specification.

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16 3.8 Alighting Gear

Requirement: Paragraph 7.60 - "Air loads existing at 150% of sea level stalling speed with flaps shall appear to act on the landing gear installation."

Deviation: Air loads existing at 270 knots, 237% of the speed attainable with $C_L = 0.75$ and airplane weight 21,500 pounds, shall appear to act on the landing gear installation.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary. In addition, this airplane is not equipped with flaps.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Continued)
17	3.8	Alighting Gear

Requirement: Paragraph 7.60 - "It shall be possible to operate the landing gear at all speeds up to 175 percent of the stalling speed."

Deviation: It shall be possible to operate the landing gear at all speeds up to 270 knots, 237 percent of the speed attainable with $C_L = 0.75$ and airplane weight 21,500 pounds.

Reason for Change and Remarks: Due to the flying characteristics of this airplane it is necessary to design the alighting gear to operate at higher speeds than 175% of stalling speed. Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

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Deviation	Paragraph	AMC Manual 80-1 (Continued)
17a	3.8.2.6	Main Landing Gear Doors and Fairings
	3.8.4.6	Nose Landing Gear Doors and Fairings

Requirement: Paragraph 7.701a. - "Landing gear doors shall be designed to close when the landing gear is in the fully extended position."

Deviation: The landing gear doors need not be designed to close when the landing gear is in the fully extended position.

Reason for Change and Remarks: The above requirement is basically for aircraft with low thrust to reduce drag during take-off. Also, due to the increase in weight and the complexity in design, it is not deemed advisable to comply with the above requirement. This is in agreement with the airplane as mocked-up and inspected by the Mock-up Board.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Continued)
18	3.2.11	Standard Parts
	Requirement:	Paragraph 8.20 - Rivets. "All rivets must conform to those shown in the Army Air Forces Standards Book."
	Deviation:	Corrosion-resistant steel rivets conforming to Contractor's Standards Q-4304 and Q-4310 may be used.

Reason for Change and Remarks: These Contractor standards have been approved by AMC letter.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
19	3.2.11	Standard Parts

Requirement: Paragraph 8.21 - Bolts. "AN standard bolts and screws shall be used in the primary structure of the aircraft."

Deviation: NAS 464 and NAS 495 series bolts may be used. Corrosion-resistant screws may be used.

Reason for Change and Remarks: The use of these bolts has been approved by ANA Bulletin 147. Corrosion-resistant screws are for use in the vicinity of compass installations where nonmagnetic materials are required.

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Deviation	Paragraph	
20	3.2.11	Standard Parts

Requirement: Paragraph 8.21 - Bolts. "Bolts loaded in shear and subject to reversals of load shall be installed in close tolerance holes with no perceptible play."

Deviation: Shear bolts in pin-jointed structures subject to reversals of load shall be installed in close tolerance holes with no perceptible play. The term "no perceptible play" is interpreted as the actual hole diameter not exceeding the nominal bolt or pin diameter by more than 0.0015 inch for bolts or pins of 1.000 inch diameter or less, and by more than 0.0020 inch for bolts or pins with diameters larger than 1.000 inch up to and including 1.625 inch.

Reason for Change and Remarks: To define the requirements stated above in accordance with the Contractor's practice.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
21	3.2.11	Standard Parts

Requirement: Paragraph 8.22 - Nuts. "All nuts used in aircraft structures which may require removal shall be either castellated nuts conforming to Specification No. MIL-N-6034, to be locked with cotter pins, or self-locking nuts conforming to Specification No. AN-N-5 or AN-N-10."

Deviation: Applicable, except that nuts for NAS series bolts may be used, and except that nuts for corrosion-resistant steel screws may be used.

Reason for Change and Remarks: To permit use of nuts corresponding to nonstandard bolts and screws authorized.

* * * *

21a	3.2.11	Standard Parts

Requirement: Paragraph 8.2.4 - "Taper pins shall be used in all permanent connections seldom broken and where absence of play is essential."

Deviation: It shall be permissible to use rollpins instead of taper pins in the control system. Rollpins shall be in accordance with Specification MIL-P-10971 (Ord).

Reason for Change and Remarks: Rollpins are lighter in weight, and are easier to remove when necessary to do so. Also, the use of rollpins simplifies fabrication.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   AMC Manual 80-1 (Cont)

21b   3.2.11.1   Bearings

Requirement: Paragraph 8.31 - "Control surface hinges and all moving joints between push-pull rods, levers, and brackets shall have anti-friction bearings in accordance with Specification AN-B-4 and Air Force-Navy Aeronautical Standard AN200, AN201, AN202, AN206, and AN207."

Deviation: Applicable except that spherical self-aligning bearings may be used for actuating cylinder pivots.

Reason for Change and Remarks: Anti-friction bearings would impose impracticable installation problems and excessive weight due to the required large design loads.

21c   3.2.11.1   Bearings

Requirement: Paragraph 8.312 - "The static limit loads for anti-friction bearings shall not exceed the minimum non-Brinell loads given in Specification AN-B-4."

Deviation: The following shall be the bearing limit load ratings.

Bearings	Limit Load Ratings
AN200KP Series AN201KP Series AN202KP Series	8,000ND^2
AN200KS Series	4,000ND^2
AN206DSP Series	3,000ND^2
Ball Bearing Rod Ends	3,000ND^2
N = Number of Balls	D = dia of balls

Reason for Change and Remarks: The above loads are those approved by WADC ltr WCSWF 1/WCS/HLM dated 18 Aug 1952.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
22	3.20.1.2	Ground Air Conditioning

Requirement: Paragraph 8.412 - "An opening in the engine cowling for ground heaters will be provided for by either an accessory door with minimum dimensions of 12 inches diameter or an easily removable section of cowling of equivalent size."

Deviation: No engine cowling is required. However, provision shall be made for ground heating of the accessory compartment.

Reason for Change and Remarks: Engine cowling is not applicable to this type of power plant installation. Means will be provided for obtaining ground heat for engine accessories.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
23	3.4	Structural Design Criteria

Requirement: Paragraph 8.24 - "Cowling and its supporting structures shall be designed to the strength requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
24	3.22.4	Hoisting

Requirement: Paragraph 8.511 - Hoisting. "Hoisting slings shall be provided and carried as special equipment."

Deviation: Provision for carrying hoisting slings in the airplane is not required.

Reason for Change and Remarks: Insufficient space in the airplane available for stowage.

* * * *

25	3.20.1.2	Ground Air Conditioning

Requirement: Paragraph 8.52 - Ground Handling. "....provisions will be made in the aircraft fuselage at applicable stations requiring ground heating for attaching of AF standard 12-inch ground heater ducts."

Deviation: Provision for attachment of the specified ground heater ducts is not required.

Reason for Change and Remarks: Provision shall be made for obtaining ground heat for the cockpit as described in this model specification.

* * * *

26	3.4	Structural Design Criteria

Requirement: Paragraph 8.520 - "The alighting gear and its supporting structure shall be designed to the towing requirements of Specification No. C-1803."

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
26 (Cont)	3.4	Structural Design Criteria

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

Deviation	Paragraph	
27	3.4	Structural Design Criteria

Requirement: Paragraph 8.521 - "The mooring fittings and the structure to which they are attached shall be designed in accordance with Specification No. C-1803...."

Deviation: The requirements of Specification No. C-1803-E, Amendment No 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Continued)
28	3.22.3	Mooring Provisions

Requirement: Paragraph 8.521a - (1) "A mooring fitting shall be provided on the fuselage of each aircraft near the tail." (2) "For aircraft of 16,000 pounds design gross weight or less, mooring fittings attached to the wing, one on each side of the plane of symmetry and as near as practicable to the middle of the semispan, shall be provided. For larger aircraft, two wing mooring points on each side of the plane of symmetry shall be provided."

Deviation: (1) Mooring fitting on the fuselage tail shall not be required.
(2) One wing mooring point on each side of the plane of symmetry shall be provided.

Reason for Change and Remarks: (1) Due to Delta wing configuration, aft mooring provisions are incorporated in the elevon fairing moorings. (2) Due to the short wing span it is not so practical to provide two mooring points on each side.

* * * * *

Deviation	Paragraph	
29	3.4	Structural Design Criteria

Requirement: Paragraph 8.83 - "For design strength and rigidity requirements see AAF Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
30	3.4	Structural Design Criteria

Requirement: Paragraph 9.307 - "The design of the control system, and its structural supports shall be based on rigidity and the elimination of deflection, as well as upon the ultimate strength requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2 shall be as outlined in Contractor's Report No. ZU-8-003 "Outline of MX-1554 Stress Analysis Criteria" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
31	3.10.1	Primary Flight Control System

Requirement: Paragraph 9.308 - "All cables shall be separated by at least 3 inches, preferably more."

Deviation: Cable spacing may be closer than 3 inches where necessary. Each particular case shall be submitted to WADC for approval.

Reason for Change and Remarks: Maximum cable spacing will be provided; however, in some cases it is impracticable to main three-inch spacing due to limited space available.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
32	3.10.1 3.10.3	Primary Flight Control System Trim Control System

Requirement: Paragraph 9.31 - "Duplicate Controls". This paragraph under certain conditions, requires duplicate control system.

Deviation: A single cable control system shall be provided for each of the primary control systems.

Reason for Change and Remarks: The delta wing configuration requires a control system mixer, which does not lend itself to a practical dual system. Dual cable systems will unduly increase the control system friction forces and weight.

* * * *

Deviation	Paragraph	
33	3.10.1.1	Flight Station Controls

Requirement: Paragraph 9.322 - "For aircraft not equipped with fixed machine guns, pilot's control stick pistol-type grip, Drawing No. AN8003, shall be used."

Deviation: The control stick design and control switches shall conform to the requirements of the automatic fire control equipment installed in the airplane.

Reason for Change and Remarks: The automatic flight equipment installed in the airplane introduces new requirements not covered by the HIAD.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
34	3.10.1.1	Flight Station Controls

Requirement: Paragraph 9.324 - "The aircraft structure, auxiliary controls, furnishing, instruments, etc., shall clear by at least 1-1/2 inches the cockpit primary air control items in all positions...."

Deviation: Minimum clearance between control components and aircraft structure may be less than 1-1/2 inches.

Reason for Change and Remarks: Maximum clearance will be provided; however, in some cases it may be impractical to maintain the full clearance specified in the HIAD.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
35	3.14.1	Instruments

Requirement: Paragraph 9.403 - "Tab position indicators shall plainly identify by day or night the main control surface affected by the trim control,...."

Deviation: Tab position indicators shall not be required. A single light shall be installed to indicate when surfaces are in neutral (take-off) position. This light shall flash when any of the surfaces are trimmed through neutral.

Reason for Change and Remarks: USAF request at cockpit conference. The pilot needs only to know trim position prior to take-off. Trimming to be accomplished by ground crew prior to take-off.

* * * *

[redacted]

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
36	3.12.11	Propulsion System Controls

Requirement: Paragraph 9.604 - "In single-engine aircraft, at least 6 inches clearance shall be provided between the handle of the throttle lever or power lever and the handle of the control located nearest to it."

Deviation: The power control lever clearance may be reduced from the HIAD requirement.

Reason for Change and Remarks: The ejection seat clearance, landing gear lever, oxygen panel location, and automatic flight control requirements prevent adherence to this specification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
37	3.15.2	Pneumatic System

Requirement: Paragraph 10.303 - "Assume air bottle pressure to be 1800 psi. All air bottles used for emergency operation of hydraulic or pneumatic systems shall be selected for an initial air charge of 1800 psi. (Pressure lower than this results in the use of larger sized bottle and higher pressure is not available in service.)"

Deviation: Compressed air bottle pressure may be 3000 psi.

Reason for Change and Remarks: To agree with design storage pressure of the pneumatic system. The airplane carries a 3000 psi compressor.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

38 3.10.1 Primary Flight Control System

Requirement: Paragraph 10.410 - "Control Cables shall conform to Specifications No. AN-C-43 or AN-C-48."

Deviation: Hy-Co-Span may be used in lieu of cables conforming to Specifications No. AN-C-43 or AN-C-48.

Reason for Change and Remarks: The use of Hy-Co-Span simplifies the system by elimination of tension regulators and reduces weight.

* * * *

38a 3.2.11.1 Bearings

Requirement: Paragraph 10.421 - "Ball and socket joints shall not be used in control systems."

Deviation: Spherical self-aligning bearings may be used for actuating cylinder pivots.

Reason for Change and Remarks: Anti-friction bearings would impose excessive installation problems and weight increases due to the required large loads.

39 3.20.1 Air Conditioning

Requirement: Paragraph 12.341 - "Closing of the shut-off valves shall actuate simultaneously the ram air-inflow valve mechanism so as to insure continued cabin ventilation when the pressure source is not used.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

39 (Cont)

Deviation: It shall not be required that the closing of the shut-off valve actuate simultaneously the ram air-inflow valve mechanism.

Reason for Change and Remarks: Simultaneous actuation of the ram air-inflow valve mechanism with operation of the emergency shut-off valve would dump the cockpit pressure with attendant adverse physiological consequences at high altitudes.

* * * *

40 3.20.1 Air Conditioning

Requirement: Paragraph 12.342 - "A valve in the ram air line shall be mechanically or electrically linked with both the emergency pressurized air shut-off valve described in 12.341, Emergency Shut-Off Valve, and the cabin air dump valve described in 12.360, General. The linkage shall provide for positive actuation of the three valves when operating personnel desire to actuate any one of the three."

Deviation: A valve in the ram air line shall be mechanically or electrically linked with the cabin air dump valve described in 12.360, General. The linkage shall provide for positive operation of the two valves when operating personnel desire to actuate either valve.

Reason for Change and Remarks: In conformance with the deviation to Paragraph 12.341. The valve in the ram air duct should not be linked mechanically or electrically with the emergency shut-off valve.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

41 3.20.1 Air Conditioning

Requirement: Paragraph 12.345 - "Water Separator and Drain"

Deviation: Water separator and drain need not be required.

Reason for Change and Remarks: Provision for water separator is deemed inadvisable because of the extremely short duration of sealevel flight in the normal tactical application of the airplane. Such provisions impose penalties in weight, space and increased pressure drop in the low pressure pneumatic system.

* * * *

42 3.20.1 Air Conditioning

Requirement: Paragraph 12.351 - "Control of Rate of Pressure Change"

Deviation: Control of rate of pressure change need not be provided.

Reason for Change and Remarks: In conformance with Paragraph 12.350 for aircraft with one crew member and a service ceiling over 50,000 feet altitude, there will be one schedule of cabin pressure only. Therefore, the necessity for switching from normal to combat is removed.

* * * *

43 3.20.1 Air Conditioning

Requirement: Paragraph 12.372 - "Cabin Air Flow and Mixing Flow Package for Jet-Propelled Aircraft"

Deviation: Considered not applicable per reason noted.

[redacted]

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

43 (Cont) 3.20.1 Air Conditioning

Reason for Change and Remarks: Since the air turbine output is utilized for generation of electrical and pneumatic power, a temperature actuated dual mixing valve conflicts with the proper functioning of the proposed system.

* * * *

44 3.20.1 Air Conditioning

Requirement: Paragraph 12.51 - "Maximum ventilating air rate will usually be determined by cabin-temperature requirements but shall be limited to that value which will not permit air movement past seated crew members at more than 200 feet per minute air velocity."

Deviation: Air movement past seated crew members shall be kept to a minimum but may exceed 200 feet per minute air velocity.

Reason for Change and Remarks: Due to the small cockpit size and high flight speeds the airflow necessary for conditioning the cockpit at altitudes will produce local air velocities in excess of 200 feet per minute.

* * * *

45 Deleted

46 Deleted

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
47	3.12.9.6	Piping and Fittings

Requirement: Paragraph 13.33 - "All fittings such as hose nipples, elbows, flared tube fittings, etc., shall conform to Army-Navy or Air Force Standards. The end fittings used with the hose assembly conforming to Drawing AN6264 shall conform to Drawing AN792."

Deviation: Fittings shall be of light weight as approved by WADC.

Reason for Change and Remarks: Light weight fittings are used to save weight.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
48	3.12.9.5	Vent System

Requirement: Paragraph 13.344 - "All vents and drain lines shall terminate at a point outside the aircraft, passing through resilient grommets in the engine cowling where necessary to prevent chaffing, and they shall be so located or formed that drainage cannot be returned to any part of the aircraft structure or enter the exhaust wash from either upstream or downstream. Drain lines shall be easily accessible for draining from the outside of the aircraft."

Deviation: Routing and dumping of drain and vent lines shall be as approved by mock-up.

Reason for Change and Remarks: Space provisions for reservoir capacity and drain line routing can best be determined on the mock-up.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
49	3.12.9.3	Tanks (Fixed) Fuel)

Requirement: Paragraph 13.410 - "All combat aircraft, including fighter, attack, photographic, cargo(personnel carriers), and bombardment, that have a tactical operating radius of action of fewer than 3,000 nautical miles shall have internal combustible fluid tanks that afford 100 percent protection against gunfire for the power plant fluid systems."

Deviation: (a) Self-sealing tanks are not provided.

(b) Fuel tanks are pressurized

Reason for Change and Remarks: (a) Self-sealing tanks are ineffective against probable large calibre armament of enemy bombers. Self-sealing tanks reduce fuel capacity and increase weight. (b) High altitude operation requires pressurization to prevent fuel vaporization. Pressure is used for fuel transfer between tanks.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
50	Deleted.	
51	3.5.1	Wing - Description and Components

Requirement: Paragraph 13.74 - "Integral fuel tanks which consist of the aircraft structure sealed by means of elastic films, gaskets, caulking compounds, etc., (as differentiated from 'bladder' type cells) shall not be used in Air Force aircraft "

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   AMC Manual 80-1 (Cont)

51 (Cont)   3.5.1   Wing - Description and Components

Deviation: Integral fuel tanks shall be used.

Reason for Change and Remarks: Considerable previous experience by this Contractor in designing and fabrication of integral fuel tanks, both military and commercial application, have shown them to be satisfactory. Integral tanks provide maximum fuel capacity and minimum weight.

* * * *

52   3.11   Engine Section

Requirement:
Paragraph 15.26 - "Quick-Change Power Plant"
Paragraph 15.270 - "Quick-Change Requirements"
Paragraph 15.28 - "Maintenance-Inspection, Cleaning and Adjustment
Paragraph 15.29- "Maintenance-Removal and Replacement"

Deviation: Requirements of above shall be as approved by the Mock-up Board.

Reason for Change and Remarks: Mock-up is necessary to determine degree of compliance with above requirements.

* * * *

53   3.12.9.6   Piping and Fittings

Requirement: Paragraph 15.421 - "The fuel-outlet fitting from all fuel tanks, except external jettison tanks, shall be a booster-pump flange...."

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
53 (Cont)	3.12.9.6	Piping and Fittings

Deviation: Booster-pump flange shall not be required on tanks 1 and 2, left and right.

Reason for Change and Remarks: Tube outlets will be used on tanks 1 and 2, left and right, booster pumps are not used on these tanks.

* * * *

54 3.12.9.5 Vent System

Requirement: Paragraph 15.424 - "One vent connection shall be installed for each fuel tank and located at the high point of the tank when the aircraft is in normal ground position."

Deviation: Conventional type vent system shall not be provided.

Reason for Change and Remarks: Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

* * * *

55 3.12.8.1 Lubricating System - Description and Components
3.12.9.13 Refueling Provisions

Requirement: Paragraph 15.425a - "Cap shall conform to AAF Drawing No. 39B5435 with an Adapter in accordance with AAF Drawing No. 39B5294 or 44B13830."

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
55 (Cont)	3.12.8.1 3.12.9.13	Lubricating System - Description and Components Refueling Provisions

Deviation: Fuel and oil caps may be other than that specified, which are no longer acceptable for new installations.

Reason for Change and Remarks: Inasmuch as pressure refueling only is being provided, A standard bayonet locking cap will necessarily be used on the pressure refueling fitting. The oil cap may or may not be the flush type, dependent upon location of the engine-mounted tank filler neck.

* * * *

56 3.11 Engine Section

Requirement: Paragraph 15.62 - "All fuel-tank compartments (considering each group of connected cells as a tank), engine compartments, interior of wing, and interior of fuselage proper shall be isolated from each other with a liquid-, gas-, and fire-tight seal."

Deviation: A vertical fume-tight aluminum alloy bulkhead shall be installed forward of the compressor inlet. A horizontal fuel-tight aluminum alloy shroud extending from the fume-tight bulkhead aft, under the compressor section, to the wheel bay, shall be installed. A vertical stainless steel fire wall in the plane of the engine fire wall shall be installed, which will isolate the turbine and afterburner compartments from the rest of the airplane. A fire resistant shroud shall surround the turbine and afterburner from the fire wall aft.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

56 (Cont) 3.11 Engine Section

Reason for Change and Remarks: The Contractor considers that the above proposed isolation of fuel, engine compartments, and fuselage is adequate for this type of airplane. An appreciable weight saving is realized in following this proposal.

* * * *

57 3.12.9.3 Tanks (Fixed) - Fuel

Requirement: Paragraph 15.63 - "The inside of the tank compartments should be sprayed with anti-sparking paint such as clear lacquer."

Deviation: Anti-sparking paint shall not be used in conjunction with integral tanks.

Reason for Change and Remarks: The Contractor's past experience shows that anti-sparking paint is of no value.

* * * *

58 3.12.9.10 Drainage Provisions

Requirement: Paragraph 15.63 - "Each compartment will be drained by a 1/2-inch hole at the low point in normal flight altitude and on the ground, using two holes if necessary. These drain holes shall be at least 5 feet away from open exhaust and shall not be upstream or downstream of the exhaust wash."

[redacted]

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
58 (Cont)	3.12.9.10	Drainage Provisions

Deviation: It shall be permissible for the drain holes to be located upstream of the exhaust wash.

Reason for Change and Remarks: Due to the configuration of the airplane, it is impracticable to comply with the above requirements, drain holes will be located upstream of the exhaust wash.

* * * *

59 Deleted.

60	3.2.2	Materials
	3.11	Engine Section
	3.11.5	Fire Walls

Requirement: Paragraph 15.68 - "All aircraft components, including equipment and structure that might be critically affected by fires occurring in or around the engine, shall be adequately protected by stainless steel shrouding or fire walls."

Deviation: It shall be permissible to use titanium in lieu of stainless steel for nonstructural fire walls or shrouding.

Reason for Change and Remarks: Titanium is recognized as a suitable material for nonstructural fire walls and shrouds, also considerable weight saving can be obtained by using titanium in lieu of stainless steel.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
61	3.11	Engine Section

Requirement: Paragraph 16.12 - "Maximum Temperatures - Maximum Allowable Temperature. - Structure, aluminum alloy (75S-T), 200°F (93.3°C)."

Deviation: It shall be permissible for aircraft structural members to be heated to more than 200°F.

Reason for Change and Remarks: In some instances aerodynamic heating alone will heat aircraft components in excess of 200°F. Allowance for strength reduction, due to high temperatures, will be made.

* * * *

Deviation	Paragraph	
62	3.12.8	Lubricating System

Requirement: Section 16.2, Lubrication Systems

Deviation: This section of the handbook is not applicable to this airplane.

Reason for Change and Remarks: The turbo-jet engines specified for this airplane are equipped with an integral oil system and no air frame connections are required, except for installing an additional air-to-oil cooler and venting the accessory gear box.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
63	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.22 - "The lubricating system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. AN-O-8."

Deviation: The lubrication system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. MIL-L-7808.

Reason for Change and Remarks: In accordance with Pratt & Whitney J-57 Information Letter No. 43, dated 23 November 1951, the synthetic oil for use in JT3 engines is Pratt & Whitney Specification No. 521, Government Agency Specification No. MIL-L-7808.

* * * *

64	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.262 - Oil Cooler Selection - (Same as Oil Cooler Selection under 14.24) - "Oil coolers used in production aircraft shall comply with the requirements of Specification No. AN-C-75."

Deviation: Oil coolers shall conform to Contractor's Specification. The cooler shall be of the plate type in lieu of the tubular type construction.

Reason for Change and Remarks: To permit use of latest type coolers to save weight. Contractor's specification to be submitted to WADC for approval.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   AMC Manual 80-1 (Cont)

65   Deleted.

66   3.12.8.1   Lubricating System - Description and Components

Requirement: Paragraph 16.263e - "Oil Cooler Mounting (Same as Mounting under 14.252)."

Deviation: Not applicable to type of oil cooler design proposed.

Reason for Change and Remarks: Mounting requirements specified are not applicable to type of coolers being used.

* * * *

67   3.12.8.1   Lubricating System - Description and Components

Requirement: Paragraph 16.263f - "Oil Temperature Regulating Valve - (Same as Oil Temperature Regulating Valve under 14.254)"

Deviation: An oil temperature regulating valve which does not include a surge protection valve shall be provided.

Reason for Change and Remarks: Plate-type oil coolers do not require surge protection.

* * * *

68   3.12.8.1   Lubricating System - Description and Components

Requirement: Paragraph 16.278 - Engine-Breather Lines - "This point shall be so located that oil or fumes will not be discharged onto the windshield or flow into the cockpit and shall be visible to the pilot in flight."

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
68 (Cont)	3.12.8.1	Lubricating System - Description and Components

Deviation: It is not necessary that the breather line terminate at a point visible to the pilot in flight.

Reason for Change and Remarks: Since the engine breather connection is located approximately 22 feet aft of the pilot, it is not practical to run the breather line forward.

* * * *

69 3.12.9.1 Fuel System - Description and Components

Requirement: Paragraph 16.302 - "The entire fuel system shall be designed for the use of Specification No. AN-F-58 fuel. It shall also be capable of satisfactory operation with Specification Nos AN-F-32 and AN-F-48 fuels."

Deviation: Fuel system shall be designed to operate with fuel covered by Specification No. MIL-F-5624A, Grade JP-4, [redacted]

Reason for Change and Remarks: It is understood that JP-4 fuel will be procured by the Government for use in jet aircraft.

* * * *

70 3.12.9.1 Fuel System - Description and Components

Requirement: Paragraph 16.31 - "Design Requirements"

Deviation: In lieu of the requirements set forth in the HIAD, Section 16.31, the fuel system of the aircraft shall be designed as shown on Convair Drawing No. 8-20301, which shall be submitted to WADC for design approval.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
70 (Cont)	3.12.9.1	Fuel System - Description and Components

Reason for Change and Remarks: Due to the unconventional fuel system, as proposed for the F-102 airplane, the requirements of the HIAD do not apply.

* * * *

71	3.12.9.5	Vent System - Fuel

Requirement: Paragraph 16.34 - Fuel Tank Vent System (Same as Vent System under 14.33) - "Each fuel tank shall have one vent system with one common outlet. . . ."

Deviation: Conventional type vent system shall not be provided.

Reason for Change and Remarks: Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

* * * *

72	3.12.9.5	Vent System

Requirement: Paragraph 16.345 - "For all other tanks, the internal pressure shall not exceed the external pressure by more than 13.6 inches of water. With fuel having a Reid vapor pressure not greater than 7.0 psi, the maximum allowable pressure in the fuel tank during maximum climb rate shall not exceed 54 inches of water and, when the airplane is flying at a fixed altitude after climb, the pressure differential shall decrease to 7 inches of water within 20 minutes."

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
72 (Cont)	3.12.9.5	Vent System

Deviation: The fuel tank internal pressure shall be sufficient to accomplish the transfer of fuel from tank to tank as required for automatic c-g control.

Reason for Change and Remarks: This airplane incorporates a combination fuel tank purging and tank pressurization system which eliminates the conventional vent system requirements.

* * * *

73	3.12.9.2	Pumps

Requirement: Paragraph 16.351 - "Booster Pumps"

Deviation: The following shall apply in lieu of the requirements specified in Paragraph 16.351. Suitable alternating current centrifugal booster pumps shall be provided which may or may not be mounted directly on the bottom of the tan, depending on the results of suitable altitude simulated tests as conducted by the Contractor to determine desired locations in relation to the space available in the airplane. Drain lines are not required on alternating current pumps.

Reason for Change and Remarks: Conventional booster pump mounting and installation methods cannot be followed due to the depth of the fuel tanks.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
74	3.12.9.1	Controls - Fuel System

Requirement: Paragraph 16.352 - "Fuel valve controls shall be marked red...."

Deviation: Fuel valve controls need not be marked red, but shall be suitably identified.

Reason for Change and Remarks: The fuel control panel will utilize edge lighting which does not lend itself for special color identification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
75	3.12.9.8	Fuel System - Strainer and Filters

Requirement: Paragraph 16.353 - "Fuel strainers in accordance with Drawings AN4108, AN4109 and AN4145 shall be used."

Deviation: Fuel strainers, simular to AN4109, shall be provided with a capacity sufficient to handle the larger fuel flow. Strainers may be of either cast or sheet metal construction.

Reason for Change and Remarks: Fuel strainers per Drawing No. AN4109 are of insufficient capacity.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

76 3.14.1 Instruments

Requirement: Paragraph 19.0 - "The instruments and instrument boards required shall be installed in accordance with Specification No. AN-I-2."

Deviation: Instruments and instrument boards required shall be installed in accordance with Specification No. MIL-I-5997, except as specified herein.

Reason for Change and Remarks: To establish the specification the Contractor proposes to use.

* * * *

76a 3.14.3 Installation-Instruments

Requirement: Paragraph 19.00 - "A minimum clearance of 10 inches shall be provided behind the instrument board to accommodate the instruments and connections when installed."

Deviation: A minimum clearance of 6 inches shall be provided behind the instrument board.

Reason For Change and Remarks: The configuration of the instrument panel and the space limitations of the cockpit will not allow 10 inch clearance behind the instrument board.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviations Paragraph AMC Manual 80-1 (Cont)

77 3.14.3 Installation - Instruments

Requirement: Page 19-4, Figure 19-3 - "Installation of Direction of Gryo and Gyro Horizon."

Deviation: The specified instruments may not be installed in accordance with Figure 19-3.

Reason for Change and Remarks: The Contractor proposes to use small instruments to conserve space. The space limitations of the instrument panel makes it impracticable to comply with Figure 19-3.

* * * *

78 3.14.1 Instruments

Requirements: Paragraph 19.19 - "All aircraft with anti-g equipment shall have an accelerometer in accordance with Drawing No. AN5745...."

Deviation: No accelerometer is required.

Reason for Change and Remarks: The accelerometer serves no useful purpose on this aircraft.

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79 Deleted.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
80	3.17.1.1	Control Console

Requirement: Paragraph 20.2 - "Space and mounting provisions shall be made for the original panels to be easily replaced by longer panels so that other panels may be added in case of a change in radio or radar requirements after completion of the airplane design. The extra space provided shall amoun to 20 percent of that required for the installed controls."

Deviation: Twenty percent space of that required for the installed controls shall not be provided.

Reason for Change and Remarks: Due to quantity of equipment installed and to type of aircraft, there is insufficient space available to meet the above requirement.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
81	3.18.6.2 3.18.6.3	Armor Plate Cone of Fire Protection

Requirement: Paragraph 21.920 - "Protection shall be provided in all tactical AF aircraft for the crew and vital aircraft components against gunfire in accordance with the following general requirements."

Paragraph 21.921 - "Fighter Aircraft" - This paragraph gives specific requirements for fighter aircraft armor.

Deviation: Passive defense shall not be provided.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
81 (Cont)	3.18.6.2 3.18.6.3	Armor Plate Cone of Fire Protection

Reason for Change and Remarks: Unnecessary weight. The low grazing angles of the fuselage forward of the pilot, plus the rugged radome and the mass of radar equipment forward of the pilot are considered to be ample protection.

* * * *

82 3.19.1.1 Safety Belt and Shoulder Harness

Requirement: Paragraph 23.110 - "All crew and passenger seats shall be equipped with a belt; aircraft safety, Type B-14."

Paragraph 23.111 - "All crew and passenger seats, except those permanently faced rearward, shall be provided with the belt, safety, shoulder harness, Type B-16.

Deviation: A Type B-18 safety belt and a Type G-3 shoulder harness shall be installed.

Reason for Change and Remarks: WADC specified above equipment for this airplane.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
83	3.16.7	Controls - Electrical

Requirement: Paragraph 23.14 - "Heated clothing rheostat, Type Q-1B, in accordance with Specification No. 94-32357, shall be installed at each crew station in all bombers and large aircraft of 15,000 pounds gross weight or larger...."

Deviation: Heated clothing rheostat shall not be required. A receptacle in accordance with Harvey Hubbard P/N 7526 or equal shall be provided.

Reason for Change and Remarks: Heated clothing not required in that the cockpit is air conditioned.

* * * *

Deviation	Paragraph	
84	3.19.2.4	Map and Data Case

Requirement: Paragraph 23.230 - Data Case - "To provide an aircraft data case, Drawing No. 36G2873, shall be installed in all aircraft."

Paragraph 23.233 - Flight Report Holder - "All aircraft shall be equipped with a flight report holder, Type A-2, in accordance with Drawing 0161366."

Paragraph 23.234 - Map Case - "Aircraft having a cruising range over 600 miles shall be equipped with a map case at least 9 x 12 x 4 inches."

Deviation: A combination flight report holder, data and map case shall be provided.

Reason for Change and Remarks: Relatively short flight duration and large amount of electronic navigational aids installed, obviate need for separate flight report holder, map and data cases. This case will be the size specified in Paragraph 23.234, except for width, which will be as nearly to 4 inches as space permits.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
85	3.2.2	Materials

Requirement: Paragraph 24.00 - "Aircraft designers shall utilize materials and processes approved for USAF use, which are listed not only in the USAF Index of Specifications, and Bulletins Approved for USAF Procurement, but also in USAF Bulletin No. 23."

Deviation: (a) Porous sintered stainles steel may be used for wing and fin leading edges, and engine air intake duct lips. (Refer to Deviation No. 60 regarding use of titanium in lieu of stainless steel.)

(b) The wing tips may be of material not listed in USAF index of Specifications or USAF Bulletin No. 3.

(c) Armco 17-7 and 17-4 heat-treatable stainless steel sheet and bar may be used.

Reason for Change and Remarks: (a) The wing and tail leading edges will be de-iced by means of heated air which escapes through the porous metal skin. (Refer to Deviation No. 60 regarding use of titanium in lieu of stainless stee.) (b) The wing tips are constructed of honeycomb sandwich type material as covered by a Convair specification to be submitted to WADC for approval. (c) Combination high strength and ease of fabrication.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
86	3.4	Structural Design Criteria

Requirement: Paragraph 25.1 - "Demonstration Flights of aircraft shall be conducted in accordance with Specification No. R-1803-11."

Deviation: The requirements shall be as outlined in Contractor's Report No. ZM-8-002 "Structural integrity Flight Demonstration" which shall be subject to WADC approval, shall be used in lieu of Specification No. R-1803-11 dated 1 August 1947.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range, and purpose of the aircraft.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-B-2a, dated 20 August 1947 - Brake System; Aircraft, Design of
87	Deleted.	
88	3.8.2.2	Brakes

Requirement: Paragraph C-1 - "This capacity shall normally consist of 100 stops at 10 feet per second per second deceleration at the design gross weight condition of the airplane or 0.9 times the maximum alternate weight, whichever is larger."

Deviation: The capacity of the brakes shall be 50 stops consisting of; 40 stops at design landing gross weight (21,524#), 10 stops at 0.9 maximum alternate gross weight, and 1 stop at maximum alternate gross weight (28,583#). The first two conditions at a deceleration of 10 feet per second per second, the last at a deceleration of 6 feet per second per second.

Reason for Change and Remarks: An appreciable weight saving is realized by using 50 stop brakes. Also, the use of a brake parachute and high induced drag during landing attitude reduces brake requirement.

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88a	3.8.2.2	Brakes

Requirement: Paragraph D-4b and D-4e(4)a - Parking Locks

Deviation: Parking locks are not required.

Reason for Change and Remarks: Cockpit Mock-Up Board agreed that parking brakes were not required for this airplane.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-J-5 (2), dated 26 November 1947 - Jack Pads; Design and Installation of (For Aircraft)
89	3.22.2	Jacking Provisions

Requirement: Paragraph E-1a(2) - "Aircraft having a gross weight between 19, 000 and 10, 000 pounds shall be provided with four jack pads on the wings or nacelles (two on each side)."

Deviation: Two jack pads shall be installed on the wing (one on each side).

Reason for Change and Remarks: Due to the short span of the wing it is not practical to use two jack pads on each side.

* * * * *

Deviation	Paragraph	
89a	3.22.2	Jacking Provisions

Requirement: Paragraph E-4b - "Axle jack pads (shown on figures 3 and 4) for alighting gear must be integral with or permanently attached to the main alighting gear......"

Deviation: Main gear axle jack pads may be removable, and if removable, shall be conveniently stowed.

Reason for Change and Remarks: Available space in fuselage for retracted position of main landing gear does not permit the use of integral jack pads.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AN-I-21A(2), dated 2 May 1947, Interchangeability and Replaceability of Component Parts for Airplanes
90	3.2.5	Interchangeability and Replaceability

Requirement: Specification No. AN-I-21A(2).

Deviation: Specification No. AN-I-21A(2) shall not be applicable to the first or second airplane.

Reason for Change and Remarks: The first two airplanes are to be fabricated by the use of experimental type of tooling.

* * * *

91	3.2.5	Interchangeability and Replaceability

Requirement: Specification No. AN-I-21A(2).

Deviation: The component parts of the airplane manufactured subsequent to number two airplane will be interchangeable or replaceable, as the case may be, as specified in Appendix III A which is, in general accordance with Specification No. AN-I-21.

Reason for Change and Remarks: To establish the degree of interchangeability and replaceability.

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[redacted]

SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. R-1800-E(5), dated 28 May 1945 - Aircraft, General Specification for
92	None	

Requirement: Paragraph D-15 - "At least the following primary structural assemblies, if fabricated of ferrous materials, shall be magnetically inspected in accordance with Specification No. AN-I-32."

Deviation: Magnetic inspection shall be in accordance with Specification No. MIL-I-6868.

Reason for Change and Remarks: Specification No. AN-I-32 has been superseded by Specification No. MIL-I-6868.

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93 Deleted.

[redacted]

SECURITY INFORMATION

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B, dated 1 June 1948 - Stability and Control Characteristics for Airplanes
94	3.3.2.1	Stability and Control

Requirement: Paragraph 2.4 - "V_S indicated stalling speed, corrected for instrument and position error, at the gross weight corresponding to the specified condition."

Deviation: V_S shall be defined as that speed attainable with $C_L = 0.75$, at the weight corresponding to the specified condition.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

* * * *

Deviation	Paragraph	
95	3.3.2.1	Stability and Control

Requirement: Paragraph 4.1 - "Dynamic Longitudinal Stability - The short period dynamic oscillation of normal acceleration produced by moving and quickly releasing the elevator control shall be damped to 1/10 amplitude in one cycle."

Deviation: The specified number of cycles to damp may be exceeded provided that the oscillations are definitely stable and the degree of damping is satisfactory to WADC. If a device is used to provide the desired damping, it shall be required that no dangerous oscillations can occur under any circumstances without such damping device.

Reason for Change and Remarks: The longitudinal damping characteristics of the XF-92A airplane observed during flight tests were satisfactory even though not compatible with specification requirements.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
96	3.3.2.1	Stability and Control

Requirement: Paragraph 4.2.1 - "The airplane shall possess positive static stick-fixed and stick-free longitudinal stability at all normal service loadings when flying with constant throttle setting under the conditions of Table II." ".... if the curve of the variation of stick force with air speed below the trim speed does not cross the zero force axis and a pull force is required to reduce the speed from trim."

Deviation: Applicable, except that a Mach numbers above 0.85 with the airplane trimmed at a Mach number of 0.85, the variation of elevator force and deflection with Mach number may be negative if the force changes involved are not greater than 20 lbs and occur over a reasonably wide Mach number range.

Reason for Change and Remarks: A mild instability of stick force and angle will occur at transonic speeds, which is caused by an aft movement of the center of pressure with constant or decreasing control effectiveness. This effect is considered not to be a hinderance to the flying qualities because of the following:

(a) Forces involved are small.

(b) The time period is long enough to enable retrimming.

(c) The airplane is longitudinally stable.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
97	3.3.2.1	Stability and Control

Requirement: Paragraph 4.3.2 - "When the airplane is trimmed at any permissible speed, it shall be possible by use of the elevator alone to develop, at the trim speed, the maximum positive or negative lift coefficient or positive or negative limit load factor, whichever is reached first. This requirement shall apply to all of the configurations listed in Paragraph 2.2 with the exception of configuration WO."

Deviation: Applicable, except as limited by angle of attack corresponding to a $C_L = 0.75$ at stall speed, maximum available elevator deflection or maximum limit load factor.

Reason for Change and Remarks: An arbitrary angle of attack has to be selected and elevator control power be made consistent with an optimum power boost system in order that undue weight penalties do not occur.

* * * *

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
98	3.3.2.1	Stability and Control

Requirement: Paragraph 5.1.1 - "The damping of the lateral-directional oscillation with controls fixed and free shall be positive and shall be such that the time to damp to one-half amplitude and the period shall fall within the satisfactory area of the chart given in Figure 1."

Deviation: Artificial damping devices may be used to meet the requirements of R-1815B.

Reason for Change and Remarks: Artificial damping devices will be required to meet the requirements of R-1815B.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
99	3.3.2.1	Stability and Control

Requirement: Paragraph 6.3.4 - "In rolls from straight or turning flight under the specified conditions at 10,000 feet altitude, with the rudder held fixed in the position required for steady flight prior to the roll, the ailerons or other lateral control device shall be sufficiently powerful to produce the peak rolling rates corresponding to the values given in Table V."

Deviation: Available roll rates above V_{max} (normal rated power) shall be subject to approval by WADC.

Reason for Change and Remarks: Additional investigations are required to establish the roll rates.

* * * *

Deviation	Paragraph	
100	3.3.2.1	Stability and Control

Requirement: Paragraph 7.1.1 - "The complete stall is considered to be the condition associated with breakdown of the airflow over the wing, and occurring immediately after the overall trimmed lift coefficient of the airplane reaches its maximum value, except that this maximum shall not be set by limitations of available longitudinal control power. The complete stall is generally characterized by the following changes in the flying characteristics of the airplane:

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
100 (Cont)	3.3.2.1	Stability and Control

(a) In straight flight, the airplane experiences one or more of the following: An abrupt downward pitching of the nose, or an abrupt dropping of the wing and the air speed reaches a minimum.

(b) In turning flight, the normal acceleration decreases markedly or the airplane rolls markedly."

Deviation: For purposes of stalling characteristics demonstration only, the stall shall be considered to be identified by full up elevator deflection.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft.

* * * *

101 3.3.2.1 Stability and Control

Requirement: Paragraph 8.1.1 - "The control system should be capable of moving the control surfaces at rates up to 35 degrees per second for Class I and II airplanes and 50 degrees per second for Class III and IV airplanes under any aerodynamic hinge moments encountered."

Deviation: With accumulators fully charged, both systems operating and engine operating a normal rated power, it shall be possible to attain rates of surface deflection of 50 degrees per second for cylinder pressures below 1000 psi and 25 degrees per second for pressures up to 2000 psi, and oil temperatures above 80°F. Maximum (design) hinge moment occurs at a cylinder pressure of 3000 psi and zero surface rate.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AAF Specification No. 1815B (Cont)

101 Deviation (Cont)

Compliance with the foregoing requirements shall imply one simultaneous deflection of all flight controls from neutral to full throw.

Reason for Change and Remarks: This deviation is consistent with design and weight penalties.

* * * *

102 3.3.2.1 Stability and Control

Requirement: Paragraph 8.1.2 - "When the cockpit control is moved at its maximum rate to a given deflection, the control surface shall reach its corresponding deflection with a time lag not greater than 0.05 second."

Deviation: The equivalent first order time constant for the power control system shall be no longer than 0.1 seconds.

Reason for Change and Remarks: Lags not compatible with specification requirements for the slower surface rates will be sufficient small that the control characteristics will be satisfactory.

* * * *

103 3.3.2.1 Stability and Control

Requirement: Paragraph 8.4.1 - "For airplanes having two or more completely independent and equivalent power control systems, the requirements of Paragraph 8.3.1 shall be met during

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation — Paragraph — AAF Specification No. 1815B (Cont)

103 (Cont) — 3.3.2.1 — Stability and Control

Requirement: the period of transfer from one system to another. Paragraphs 8.3.2, 8.3.3 and 8.3.4 do not apply to these airplanes."

Deviation: Applicable, except that each system shall be capable of providing half of the design hinge moment. Both systems shall be in operation under normal conditions.

Reason for Change and Remarks: To enable use of independent dual systems.

* * * *

104 — 3.10.1 — Primary Flight Control System

Requirement: Paragraph 3.1.3 - "The dead spots in the controls should not exceed ±0.1 inches motion of the pilot's cockpit controls."

Deviation: The dead spots in the controls shall not exceed ±0.2 inch motion of the pilot's cockpit controls.

Reason for Change and Remarks: The function design requirements of the airplane will not permit a simplified routing of the system to meet this requirement.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1816, dated 15 June 1945 - Spinning Requirements for Airplanes
105	3.3	Aerodynamics

Requirement: Paragraph B-1 - "This specification covers the spinning requirements of airplanes."

Deviation: The requirements of this specification shall be applicable to this airplane if it can be shown that spins may be encountered.

Reason for Change and Remarks: Available data indicate that the airplane may be spinproof.

* * * *

106 3.3 Aerodynamics

Requirement: Paragraph D-3a - References Paragraph D-2a which specifies "a one-hour spin test flight."

Deviation: One-half hour spin test flight.

Reason for Change and Remarks: To conform with airplane endurance and the intent of the specification.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	U.S. Air Force Specification No. 32300-E, dated 1 March 1949 - Electrical Equipment; Aircraft, Installation of - General Specification for
107	3.16.2.1 3.16.2.2	Direct Current Power Supply Alternating Current Power Supply

Requirement: Paragraph 3.6.4 - "Remote adjusting rheostats are not required on single generator aircraft provided the regulator is located so that adjustment can be accomplished from within the cockpit.

Deviation: No provisions shall be made to permit the adjustment of voltage in flight.

Reason for Change and Remarks: The duration of flight of this airplane does not warrant adjusting voltage in flight.

* * * *

108 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.6.5 - "On aircraft with one generator, the generator circuit shall conform to Figure 2. The total resistance from terminal "GEN" of the relay switch to terminal "B" of the regulator, thence from terminal "A" of the regulator to terminal "A" of the generator shall not exceed 0.25 of an ohm.

Deviation: The direct current generator circuit shall be of a special design conforming to Convair Specification ZM-8-005 to be submitted to WADC for approval.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the improved simplified design of the direct current circuit.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph USAF Specification No. 32300-E (Cont)

109 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.6.11 and 3.6.12 - "Generator circuit protectors and circuit breakers."

Deviation: Not applicable. Circuit protectors in the generator circuit shall be installed to provide adequate protection of the system, and shall be subject to approval by WADC.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the improved simplified design of the direct current circuit.

* * * *

110 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.7.6 - "Generator controls consist of one ammeter per generator, one control switch per generator, one voltage adjusting rheostat per regulator, if required, one generator failure indicator light per generator and one voltmeter. '....'These controls shall be grouped together on the pilot's or engineer's electrical panel. On single generator aircraft the voltage adjusting rheostats are not required provided voltage adjustment can be accomplished from the cockpit."

Deviation:

1. A voltmeter shall not be required.
2. The ammeter shall be located on the side panel and not on the pilot's electrical panel.
3. It shall not be required that the voltage be adjusted from the cockpit.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
110 (Cont)	Deviation	4. The generator switches shall be as required by the simplified control system, and shall be subject to approval by WADC.

Reason for Change and Remarks: 1 and 3 - The duration of operation and the complexity of the airplane makes provisions for reading voltage unnecessary and undesirable. 2 - Space limitations make it desirable to locate the ammeter on the side panel. 4 - The simplified control system will reduce the number of operations required during an emergency.

* * * *

111 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.8 - "A sub-base in accordance with AN-3204-2 for mounting the voltage regulator, shall be installed in a horizontal position when the airplane is in a normal flight attitude.

Deviation: No regulator sub-base shall be installed.

Reason for Change and Remarks: Regulator is included as a part of the control panel.

* * * *

112 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.9.3 - "The reverse current relay shall be remotely controlled as shown on Figures 2, 3 and 4 and the controls shall be installed on the pilot's or engineer's electrical switch panel.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
112 (Cont)	3.16.2.1	Direct Current Power Supply
	Deviation:	The requirement of the above paragraph shall not apply.

Reason for Change and Remarks: The functions of the reverse current relay are included in the control panel.

* * * *

Deviation	Paragraph	
113	3.16.11.2	Signal Assemblies
	Requirement:	Paragraph 3.17.1 - "The landing gear indicating system for all aircraft shall consist of one indicator, in accordance with Specification No. 21250, for each retractable unit of the landing gear system and one red indicator light, Type AN3157-6."
	Deviation:	The red indicator light shall not be Type AN3157-6, but shall be of a type suitable for inclusion within the knob of the landing gear control handle, subject to USAF approval. Indicators shall be in accordance with Specification MIL-I-6839.

Reason for Change and Remarks: This is in compliance with Paragraph 6A120c of the HIAD, as revised July 1950. The Contractor believes this later revision should be followed for this item. Specification MIL-I-6839 supersedes Specification No. 21250/

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
114	3.16.11.2	Signal Assemblies

Requirement: Paragraph 3.19 - "An indicator light, AN3157-6, as shown on Figure 9, shall be installed near the cabin pressure altimeter to warn the pilot that the cabin pressure had decreased. A cut-off switch, AN3021-8, shall be located near the indicator light."

Deviation: Cabin pressure warning shall not be installed.

Reason for Change and Remarks: Information received from WADC, in connection with another USAF contract, indicates that cabin pressure warning is no longer desired.

* * * *

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
115	3.16.3.1 3.16.3.2	Instrument Power Electronic Equipment Power

Requirement: Paragraph 3.20.1 - "When inverter-powered equipment, such as Type B electronic turbo regulators and electric flight instruments, are essential to maintain flight, a spare inverter shall be provided. The spare inverter may also be used as an operative spare to supply power to equipment which is not essential to maintain flight."

Paragraph 3.20.2 - "When continuation of alternating current power is essential to operation of equipment, an automatic change-over control shall be used with the spare inverter."

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
115 (Cont)	3.16.3.1 3.16.3.2	Instrument Power Electronic Equipment Power

Deviation: Inverters shall be installed for standby operation only in the event of failure of the airplane alternating current generator. Automatic changeover shall not be required.

Reason for Change and Remarks: The alternating current power will be obtained from the alternating current generator whose frequency will be regulated within customary requirements. The automatic change-over feature on inverters has been found to be unnecessary. Reference AIA Report ATC No. 51-47, dated 19 September 1951.

* * * *

116 Deleted.

117 Deleted.

118 Deleted.

119 3.16.2.2 Alternating Current

Requirement: Paragraph 3.21.7 - "The variable frequency alternating current external power receptacle shall be connected in accordance with the circuit shown on Figure 1."

Deviation: The alternating current receptacle shall be connected to conform to the requirements of the circuit.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the improved simplified design of the alternating current circuit.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
120	3.16.4	Equipment - Installation

Requirement: Paragraph 3.22.1 - "All relays shall conform to Specification No. MIL-R-6106 and shall be subject to approval of the specific application by the Procuring Agency. Non-standard open contact relays shall not be used."

Deviation: Special relays, as approved by USAF, may be used where required.

Reason for Change and Remarks: Due to complexity of design, it will be necessary in some cases to use special relays.

* * * *

121	3.16.11.4	Meters

Requirement: Paragraph 3.25.2 - "A direct current voltmeter, in accordance with Specification No. AN-S-19, shall be installed as shown on Figure 14."

Deviation: A direct current voltmeter shall not be required.

Reason for Change and Remarks: USAF request made at cockpit conference.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	USAF Specification No. 32300-E (Cont)
122	3.16.11.3 3.16.11.4	Warning Lights Meters

Requirement: Paragraph 3.25.3 - "Meters shall be located on the pilot's or engineer's instrument panel and shall be grouped together and in close proximity to the generator control switch the voltage control rheostat, and the generator failure indicating lights."

Deviation: (a) Meters need not be located in close proximity to the generator controls.

(b) The generator failure indicating light shall be located on the power control panel.

(c) The location of the meter and generator failure lights shall be subject to approval of the Mock-Up Board.

Reason for Change and Remarks: (a) Congestion in the cockpit and the requirement for giving preference to the MX-1179 controls makes compliance impossible. (b) USAF request made at cockpit conference. (c) WADC request contained in ltr 52WC-22125 of 2 July 1952.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40149, dated 2 September 1947, Check List; Air Crew Operation
123	3.19.2.5	Check List

Requirement: Paragraph E-1b(2)a - "The material with which the content is printed on the plate shall be a phosphorescent substance having a peak brightness of at least 100 microlamberts when measured in accordance with provisions of Specification No. AN-L-1. It shall have a phosphorescent value of at least 15 percent of its peak brightness 30 seconds after removal from the source of excitation and at least 3 percent of its peak brightness 2 minutes after its removal from the source of excitation."

Deviation: The check-off list shall be illuminated according to Specification No. AN-P-89.

Reason for Change and Remarks: For uniformity and ease of servicing all lighting in the cockpit is red light. There is no ultraviolet light provision in the cockpit.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C, dated 15 December 1947, Anti-Icing Equipment for Aircraft (Heated Surface Type), General Specification for
124	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-1e. - "Antenna masts, pitot tubes, radar vanes and airfoils, and other structures of similar nature which project into the air stream so as to be exposed to and adversely affected by ice accumulations shall be protected by the anti-icing system."

Deviation: Applicable, except that the radome will be protected by a freezing point suppressant liquid spray.

Reason for Change and Remarks: Freezing point suppressant liquid spray system recommended by WADC Components System Laboratory.

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Deviation	Paragraph	
125	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-2a. - "The anti-icing system shall provide protection against an icing condition...., and wherein the size of the water droplets is not less than 15 microns in diameter."

Deviation: The anti-icing system shall provide protection against an icing condition,...., and wherein the mean effective cloud droplet diameter is not less than 15 microns.

Reason for Change and Remarks: The accepted method of designing for the protection of aircraft against ice is based on a mean effective cloud droplet diameter rather than a minimum diameter.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AAF Specification No. 40395-C (Cont)

126 3.20.2.1 Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-3. - "No aircraft structural members shall be heated to more than 200°F."

Deviation: It shall be permissible for aircraft structural members to be heated to more than 200°F.

Reason for Change and Remarks: In some instances aerodynamic heating alone will heat aircraft components in excess of 200°F. Allowance for strength reduction due to high temperatures will be made.

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127 3.20.2.1 Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-5. - "The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than five degrees Fahrenheit after two hours of operation."

Deviation: The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than 5°F during the length of time that the anti-icing system may be in operation.

Reason for Change and Remarks: The flight time under icing conditions will be much less than two hours.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AAF Specification No. 40395-C (Cont)

128 3.20.2.1 Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-8a. - "The anti-icing system shall be capable of distributing heat to remove frost and ice from the wing and empennage surfaces when the airplane is at rest on the ground at all ambient temperatures down to -65°F."

Deviation: When the airplane is at rest on the ground the anti-icing system shall be capable of distributing heat to remove frost and ice from the wing and empennage surfaces which are anti-iced during flight.

Reason for Change and Remarks: In clarification of requirements.

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129 3.20.2.1 Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-9. - "The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, dated 9 January 1946."

Deviation: The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, dated 9 January 1946, or other authoritative literature.

Reason for Change and Remarks: There is authoritative literature which is more up to date and more realistic with respect to predicting water catch, water load profiles, and heat requirements.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40935-C (Cont)
130	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraphs F-5 through F-5b. - Conditions for Testing:

Deviation: The performance of the porous stainless steel anti-icing system used on the wing and tail shall be determined by emperical tests and the analytical performance prediction methods shall be established on the basis of these laboratory data. At that point of development an applicable flight test program representative of actual operating conditions of the airplane may then be jointly determined by WADC and the Contractor.

Reason for Change and Remarks: The thermodynamic mechanism of the porous stainless steel skin system is entirely different from conventional nonporous skin systems so that conventional methods of analysis and test are not applicable.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-5072, dated 6 April 1949-Instrument Systems; Pitot Static Tube Operated, Installation of
131	3.14.3	Installation - Instruments

Requirement: Paragraph 3.3.6 - "The pitot and static pressure lines connecting the pitot and static tubes to the instruments shall conform to Specification No. WW-T-787,...."

Deviation: The pitot and static lines shall conform to Specification No. WW-T-787 where advisable.

Reason for Change and Remarks: To permit installation of suitable non-metalic lines in radome area.

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132	3.14.3	Installation - Instruments

Requirement: Paragraph 3.3.15 - "When specified, an alternate source of static pressure for each pitot-static tube shall be provided by installing a static pressure selector valve conforming to Drawing AN5831,...."

Deviation: An alternating source of static pressure shall not be required.

Reason for Change and Remarks: It is anticipated that special means with respect to static sources will have to be taken to meet the requirements for instrumentation and MX-1179 equipment. The Contractor proposes to satisfy these particular requirements.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-5072 (Cont)
133	3.14.3	Installation - Instruments

Requirement: Paragraph 4.3.3.4.3 - "The air speed and altitude indication errors due to the location of the pitot-static tube, corrected to standard sea level conditions, shall not exceed the limits specified in Table I when tested in flight."

Deviation: In the transonic and supersonic speeds the Contractor will attempt to obtain the maximum accuracy possible using latest techniques.

Reason for Change and Remarks: The available equipment is not expected to yield the specified accuracies at transonic speeds.

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[redacted]

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-W-5088, dated 14 March 1951 - Wiring; Aircraft, Installation of
134	3.16.5	Wiring

Requirement: Paragraph 3.5.1.3 - "In areas where the cable temperature exceeds 100°C (212°F), cables specifically approved for high temperature use shall be installed."

Deviation: Where a temperature of 100°C (212°F) is exceeded only during high speed operation, high temperature wire shall not be required. High temperature wire shall be used in the fuselage aft of the firewall where temperatures exceed 250°F for periods of 5 minutes or longer.

Reason for Change and Remarks: Short duration of high temperature operation does not warrant the additional weight and cost. High temperature wire will be used wherever there is any possibility of damage to excessive temperature.

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135	3.16.10.2	Electrical Connectors

Requirement: Paragraph 3.6.6.4 - "Connectors for general aircraft wiring shall be in accordance with Specification No. MIL-C-5015."

Deviation: A minimum number of nonapproved type connectors may be used where necessary, subject to the approval of the Procuring Agency.

Reason for Change and Remarks: This will permit the contractor to make the best possible design from the servicing standpoint.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-W-5088 (Cont)

136 3.16.5 Wiring

Requirement: Paragraph 3.7.3 - "Cable groups shall contain no more than 26 cables, except as provided in Paragraph 3.7.3.2."

Deviation: It shall be permissible to install cable groups with more than 26 cables, provided, however, that such cable groups shall be kept to a minimum and shall be used only where such cable groups are required to go through congested areas.

Reason for Change and Remarks: The size of the airplane and the large number of cables required make it impossible to meet this requirement in all cases.

* * * *

137 3.16.5 Wiring

Requirement: Paragraph 3.11.1.2 - "Master diagrams shall be substantially in accordance with Drawing No. 45L6937, and may be on multiple sheets or in book form in accordance with Specification No. MIL-H-5473."

Deviation: Master diagrams shall be on individual sheets in accordance with Specification No. MIL-H-5473, except that no internal diagrams shall be required.

Reason for Change and Remarks: Internal diagrams will be included on the schematics and to include them on the circuit diagrams would be a duplication adding unnecessary work.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-H-5440, dated 9 June 1950 - Hydraulic Systems; Design, Installation and Test of Aircraft
138	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.5.4 - "Disengagement and By-Passing - Provisions shall be made in the design of power-boosted and power-operated surface control systems for disengaging the actuator in the event of failure or jamming of the actuator, control valve or connecting linkages. Provisions need not be made for re-engaging in flight. Provisions shall be made for automatically by-passing, where necessary, the fluid from one side of the actuator to the other in the event of a power system failure. In addition, provisions shall also be made for temporarily by-passing the fluid from one side of the actuator to the other during periods when it is desired to operate surface controls manually with the hydraulic pressure turned off and the actuator disengaged."

Deviation: Disengagement and by-passing will not be required.

Reason for Change and Remarks: This is not considered applicable to a full-power control system.

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139 Deleted.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-H-5440 (Cont)

140 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.14 - "Gages - Pressure gages in accordance with the applicable specifications listed in Section 2 shall be provided to indicate the system pressure in the hydraulic system or subsystems where necessary."

Deviation: Remote reading hydraulic gages may be used.

Reason for Change and Remarks: Remote reading gages are considered desirable to prevent routing of high pressure hydraulic lines within the cockpit area.

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141 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.25.4 - "Normal ground-servicing, fluid-level range shall be indicated with the accumulator or accumulators completely discharged of oil pressure and another level range to indicate the safe operating limit with accumulators charged to normal air and oil pressure."

Deviation: Indication of fluid level range, with accumulators filled with oil, is not required.

Reason for Change and Remarks: It is not practical to fill the reservoir with the system in operation and accumulators filled with oil.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-H-5440 (Cont)

142 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.25.5 - "The reservoir pressure shall be controlled by an external, nonadjustable pressure regulating device set to 12 psig (26.7 psia) which shall be connected to the air space above the oil level in the reservoir to protect the reservoir from rupturing...."

Deviation: Pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of hydraulic pumps.

* * * *

143 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.29.3 - "The pressure drop from the reservoir to the pump intake port....shall be such that the pressure at the inlet port will not be less than 14 inches of mercury absolute nor more than 12 psig (26.7 psia)."

Deviation: Applicable, except as modified in deviation to Paragraph 3.8.25.5 of MIL-H-5440.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps.

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144 Deleted.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5514A, dated 7 June 1950 - Packings; Installation and Gland Design of Aircraft Hydraulic and Pneumatic (General Specification for)
145	3.15.1.1	Hydraulic System - Description and Components

Requirement: Paragraph 1.1 - "This specification is drawn to establish basic design criteria covering use and application of packings, packing glands, and related features as used in hydraulic system equipment in accordance with Specification No. MIL-H-5440, using MIL-O-5606 hydraulic fluid, and in pneumatic system applications, in accordance with Specification No. MIL-P-5518."

Deviation: Applicable, except that special seals may be required for local high temperature conditions. Such special seals shall be submitted to WADC for specific approval for each kind of application.

Reason for Change and Remarks: The seals of Specification No. MIL-P-5514 are not suitable for high temperature use.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518, dated 3 January 1950 - Pneumatic Systems; Design, Installation and Test of Aircraft.
146		Deleted.
146a.	3.15.2	Pneumatic System

Requirement: Paragraph E-3b(2) - "Pneumatic units such as air bottles shall withstand a proof pressure equal to 200 percent of the system cut-out pressure."

Deviation: Proof pressure shall be 5/3 times the system cut-out pressure. (Reference Convair Specification ZM-8-024.)

Reason for Change and Remarks: Air bottles will be non-shatterable and shall withstand gunfire test. Higher testing pressures should not be required.

146b. 3.15.2 Pneumatic System

Requirement: Paragraph E-3C(2) - "Air bottles shall be capable of withstanding a burst pressure equal to 200 percent of the proof pressure."

Deviation: Burst pressure shall be 20/9 times the system cut-out pressure. (Reference Convair Specification ZM-8-024.)

Reason for Change and Remarks: Air bottles will be non-shatterable and shall withstand gunfire test. Higher testing pressures should not be required.

146c. 3.15.2 Pneumatic System

Requirement: Paragraph E-4 - "The pneumatic system shall operate satisfactorily within the range of outside air temperatures and altitudes shown in figure 1. Under none of these condi-

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518 (Cont)
146c. (Cont)	3.15.2	Pneumatic System

Requirement: (Cont) tions shall the temperature of the air under main system pressure in the air bottles and the remainder of the pneumatic system after the air bottles, exceed 71°C (160°F) during system operation. In the event that units such as hoses and valves located ahead of the air bottles would be adversely affected by temperatures above 71°C (160°F) provisions shall be made to limit the temperature to 71°C (160°F) during system operation."

Deviation: Component temperatures may exceed 160°F.

Reason for Change and Remarks: Components will be subjected to temperatures above 160°F due to aerodynamic and engine heating. There is insufficient cooling to maintain temperatures of 160°F or lower. These components will be designed and tested to insure proper operation at the temperatures they are exposed to.

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Deviation	Paragraph	
147	3.15.2	Pneumatic System

Requirement: Paragraph E-13a(1) - "The ground charging connection shall be installed in accordance with Drawing AND10071 ...."

Deviation: Applicable, except that AND10071 valve installation may be replaced by a valve permitting greater air flow.

Reason for Change and Remarks: To reduce ground charging time.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS.

Deviation	Paragraph	Military Specification No. MIL-P-5518 (Cont)
148	3.15.2	Pneumatic System

Requirement: Paragraph E-22a(1) - "The use of all packings shall be as specified in Specification No. AN-P-74."

Deviation: Applicable, except that in special cases where friction forces are detrimental, other types of packings may be used subject to WADC approval.

Reason for Change and Remarks: Friction may be critical in certain valves.

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Deviation	Paragraph	Military Specification No. MIL-P-5518 (Cont)
149	3.15.2	Pneumatic System

Requirement: Paragraph E-25a - "Pressure gages AN5769 or AN5771, in accordance with Specification No. AN-G-2, shall be provided......"

Deviation: Applicable, except that remote reading indicators may be used.

Reason for Change and Remarks: Remote reading gages are considered desireable to prevent routing of high pressure hydraulic lines within the cockpit area.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-R-5520, dated 3 January 1950 - Reservoirs; Hydraulic
150	3.15.1.1	Hydraulic System

Requirement: Paragraph E-1i(2) - "Where pressurized reservoirs are used, means shall be provided to limit internal pressures to a maximum of 12 pounds per square inch gage."

Deviation: Applicable, except that the pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps.

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[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-5585A, dated 8 March 1951 - Installation of Low Pressure Oxygen Equipment in Aircraft, General Specification For
150a	3.19.5	Oxygen Equipment

Requirement: Paragraph 3.6.1.2 - "In combat aircraft, the individual cylinders shall be mounted to present the smallest target area from the rear of the aircraft, and banks of cylinders shall be so installed that if each cylinder were represented by a point, these points would lie on a line or in a plane perpendicular to the direction of flight of the aircraft."

Deviation: It shall be permissible to install the three oxygen bottles in pyramid fashion.

Reason for Change and Remarks: There is insufficient space to permit compliance with above requirement. The pyramid type installation of the oxygen bottles was approved by the Airplane Mock-Up Board.

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150b	3.19.5	Oxygen Equipment

Requirement: Paragraph 3.6.9.1.3 - "In single-place aircraft, the deluter demand regulator shall be installed on the right-hand side of the cockpit, ..."

Deviation: The regulator may be installed on the left-hand side of the cockpit.

Reason for Change and Remarks: Provides better accessibility to regulator in event of emergency. Installation of regulator on left-hand side was approved by the Cockpit Mock-Up Board and the Airplane Mock-Up Board.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-5842(USAF), dated 1 September 1950 - Transparent Areas; Anti-Icing, Defrosting and Defogging Systems, General Specification for
151	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.2.2.1 - "The windshield shall be defined as the transparent area of areas which are intercepted by a line through the eyepoint of the pilot (or copilot) in the forward and forward oblique direction (approximately 45 degrees to either side of straight ahead) and which are normally used in flying and landing the aircraft."

Deviation: The windshield shall be defined as the flat glass area in the center.

Reason for Change and Remarks: It is planned to use an electrically-conductive coating for anti-icing which can be used only on flat glass.

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152	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.6 - "A clear vision panel (one which is openable in flight under conditions of ice, frost and fog), or a section of transparent area maintained in a clear condition under conditions of ice, frost, and fog, shall provide vision to the pilot in the event of failure of the normal defroster, defogging, or anti-icing system or systems."

Deviation: Emergency vision as defined in Paragraphs 3.6, 3.6.1 and 3.6.2 of Specification No. MIL-T-5842 will not be provided.

Reason for Change and Remarks: An operable panel is not considered practicable from the standpoint of clearance required and obstruction to pilot's vision due to framework required. The only space available for an additional clear transparent area is on the curved glass panels where electrically-conductive coatings cannot be used.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5902(USAF), dated 1 June 1950 - Purging Systems; Aircraft Fuel Tank, Internal and External, General Specification for
153	3.12.9.11	Deleted.
154	3.12.9.11	Deleted.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5902 (Cont)
155	3.12.9.11	Deleted.
156	3.12.9.11	Deleted.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-I-5997(USAF), dated 31 January 1951, Instruments and Instrument Panels, Aircraft, Installation of
157	3.14.3	Installation - Instruments
	3.19.2.2	Panel - Installation

Requirement: (1) Paragraph 3.12 - "The main instrument panel(s) shall be mounted normal to the longitudinal axis of the airplane."

(2) Paragraph 3.2.1 - "All instrument panels shall be mounted on vibration absorbers constructed in accordance with the requirements of Specification MIL-A-5840."

(3) Paragraph 3.3.4 - "The transmitters shall be mounted in a location where the temperature never exceeds 70°C."

Deviation: (1) The instrument panel shall be mounted with a slope of 15° measured forward of the plane normal to the longitudina l axis of the airplane.

(2) Instrument panel shall not be mounted on vibration absorbers.

(3) Instrument transmitters shall be mounted in compartments in which the temperatures shall not exceed 70°C for extended periods but may reach 120°C for periods not to exceed 15 minute duration.

Reason for Change and Remarks: (1) To provide maximum visibility over the instrument panel, provide optimum visibility of the instruments on the panel and provide for the maximum number of instruments on the panel while maintaining the optimum location of the radar scope. (2) Experience with aircraft powered with gas turbines has indicated that the vibration transmitted to the instrument panel is within acceptable limits. (3)It is not considered necessary to use special transmitters for high temperature operation since high temperature, if for a limited time only, will not cause the temperature of the units to rise sufficiently to cause damage.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053, dated 1 June 1950 - Tests; Landing Gear Shock Absorber Drop
158	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-7 - "The assembly of the shock absorber, wheel and tire shall be dopped freely and shall develop a vertical velocity of 12 feet per second upon ground contact. The necessary drop height is normally taken as 27 inches which shall be measured vertically from the position of the assembly when the tire is just contacting the ground or platform."

Deviation: The assembly of the shock absorber, wheel and tire shall be dropped freely and shall obtain the following contact velocity: (1) A contact velocity of 9 feet per second with 1W wing lift shall not exceed the established limit load factor at design landing weight. (2) A contact velocity of 12 feet per second with 1W wing lift at design landing weight shall not fail the shock strut structure. (3) A contact velocity of 5 feet per second shall be used to establish the limit load factor at design take-off weight. The 1W wing lift shall be considered in effect. The effective weight (W_e) must be correct for the velocity used. This test may be run in conjunction with the overload test specified in Paragraph F-15.

Reason for Change and Remarks: (1) To establish the limit load factor at the design landing weight. (2) This test is to substantiate that the strut has suffcient energy absorption capacity for an extremely hard landing at design landing weight. (3) This test is to substantiate that the strut has sufficient energy absorption capacity for an extremely hard landing at design take-off weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
159	3.8.2.4 3.8.4.4	Shock Absorbers - Main Landing Gear Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-8 - "Nose Wheel Type Airplane - The main landing gear and the auxiliary landing gear shall be dropped on a platform inclined at 18 degrees and 16 minutes to the horizontal, to provide an aft component of load on the landing gear."

Deviation: The main landing gear and the auxiliary landing gear shall be dropped on a horizontal surface. The wheel shall be spun in the reverse direction when dropping on the stationary surface at a velocity corresponding to design landing speed. The rolling radius of the tire shall be considered to be moving at this velocity. The surface upon which the landing gear is dropped may be commercial finish steel plate, or equivalent. The moment of inertia of the rotating parts of the brakes shall be simulated for the drop test.

Reason for Change and Remarks: To simulate actual airplane conditions and to establish test conditions. Use of rolling radius requested by WADC letter WCSWF/NMR/nlt dated 16 October 1951.

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Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
160	3.8.2.4 3.8.4.4	Shock Absorbers - Main Landing Gear Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-10 - "The total droppable weight in the jig is named the 'effective weight' and shall be determined by the following formula:

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
160 (Cont)	Requirements	(Cont)

$$W_e = \frac{27W}{d + 27}$$

W_e = effective weight

W = 1/2 the stress analysis gross weight of the airplane for the main landing gear, or the static weight on the auxiliary gear.

d = The pneumatic throw on the tire plus full vertical axle travel. The pneumatic throw of the tire is the deflection of the specific tire under a dynamic load of (0.9N-1)W pounds. The value of "d" will normally be determined from tire load deflection curves furnished by tire manufacturers or the Procuring Agency. The pressure in the tires shall be that required for proper inflation on the airplane with gross weight W. For main and tail tires, the tire pressure shall be that required for the static reaction on the tires with the airplane in the 3-point position. For the nose wheel, the tire pressure shall be that computed by the method given in Section II, Part V, Paragraph 73 of the Handbook of Instructions for Airplane Designers."

Deviation: Effective Weight - When separate means for supplying the 1W wing lift is provided, the total droppable weight in the jig shall be Wd. When separate means for supplying the 1W wing lift are not provided, the total droppable weight in the jig shall be reduced to an effective weight as determined by the following formula:

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-T-6053 (Cont)

160 (Cont) Deviation (Cont) point position. The tire pressure for the nose wheel shall be that computed by the method given in Section 7 of the Handbook of Instructions for Airplane Designers.

Reason for Change and Remarks: This deviation is required in order to be consistent with other deviations listed herein (Items 1 and 2).

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161 3.8.2.4 Shock Absorbers - Main Landing Gear
3.8.4.4 Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-10a - "A drop of 18 inches shall be made prior to making any test records. This is not necessary if the mass in the jig is tied to the basket."

Deviation: A drop of 12 inches shall be made prior to making any test records.

Reason for Change and Remarks: To be consistent with deviations listed herein (Items 1 and 2).

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162 3.8.2.4 Shock Absorbers - Main Landing Gear
3.8.4.4 Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-11 - "The maximum allowable load factor developed in the drop test shall not exceed the value given in the following formula:

$$N_j = \frac{(0.9N-1)W}{W_e}$$

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | Military Specification No. MIL-T-6053 (Cont)

160 (Cont) | Deviation (Cont)

$$W_e = \frac{hW_d}{d + h'}$$

$$h' = \text{jig drop height} = \frac{(\text{contact velocity} - V)^2}{2g}$$

where:

V = Area under acceleration vs time curve acceleration = (L. F. -1)g between time of contact and time of load factor equals one.

W_e = Effective Weight - This value must be checked after a drop of "h" inches to insure that it is within 3% of the calculated value and corrected if necessary.

W_d = One-half the design landing weight for the main gear or the static weight on the nose gear.

d = The pneumatic throw of the tire plus the estimated vertical axle travel. The pneumatic throw of the tire is the deflection of the specific tire under a dynamic load of Ng W pounds. The value of the pneumatic tire throw will be determined from tire load deflection curves furnished by the tire manufacturers or the Procuring Agency. The pressure in the tires and shock struts shall be that required for proper inflation on the airplane under maximum take-off gross weight. For the main gear tire, the tire pressure shall be that required for the static reaction with the airplane in the three-

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-T-6053 (Cont)

162 (Cont) Requirement (Cont)

N_j = jig load factor = acceleration $(\frac{dv}{dt})$ in g's recorded in the jig + 1.

W = 1/2 design gross weight of the airplane for the main landing gear or static weight on the auxiliary gear.

N = ultimate ground load factor as determined from the Procuring Agency's applicable specification.

W_e = effective weight

Deviation: When separate means for supplying the 1W wing lift are provided, the maximum allowable load factor developed in the drop test shall not exceed N_g.

$$N_j = N_g$$

When separate means for supplying the 1W wing lift are not provided, the maximum allowable load factor developed in the drop test shall not exceed the value given in the following formula:

$$N_j = \frac{N_g W_d}{W_e}$$

N_j = jig load factor = acceleration $(\frac{dv}{dt})$ in g's recorded in the jig + 1.

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-T-6053 (Cont)

162 (Cont) Deviation (Cont)

W_d = 1/2 design landing weight for the main gear or the static weight on the nose gear.

N_g = $n_a - 1$.

n_a = airplane limit landing load factor.

W_e = effective weight.

Reason for Change and Remarks: To be consistent with application of 1W wing lift as specified in other deviation listed herein (Item 1).

* * * *

163 3.8.2.4 Shock Absorbers - Main Landing Gear
3.8.4.4 Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-14 - "Records shall be taken as direct readings from the test rig and shall be taken at intervals of three inches up to and including the maximum drop height of 27 inches."

Deviation: Direct Reading Records - Records shall be taken as direct readings from the test rig and shall be taken at intervals of three inches up to and including the drop height specified in Paragraph F-7, Item 1.

Reason for Change and Remarks: To be consistent with deviation listed in Item 1.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A, dated 12 September 1951 - Lighting Equipment; Aircraft Instrument Panel, General Specification for Installation of
164	Deleted.	

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503(USAF), dated 5 July 1951 - Lighting Equipment; Aircraft, General Specification for Installation of
164a	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.3 - The part number of the taxi lamp assembly is shown in table I.

Deviation: An AN3130-4560, 600 watt lamp shall be used for the taxi light.

Reason for Change and Remarks: Experience has shown that a 600-watt lamp is desirable, as evidenced by AMC requests on other USAF contracts.

* * * *

165 3.16.11.3 Warning Lights

Requirement: Paragraph 3.2.2.8.1 - "Warning lights shall be red non-dimming small jewel in accordance with Drawing AN3157 and shall be provided in connection with systems over which operating personnel have no control and gives a warning of trouble not caused by personnel action and indicates immediate action required to prevent immediate loss of aircraft."

Deviation: Warning lights shall be as agreed at the time of the mock-up.

Reason for Change and Remarks: The configuration of the cockpit and the mission of the airplane necessitates the integration of the entire cockpit for maximum utility and the warning system particularly will be of nonstandard configuration.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6730, dated 9 June 1950 - Lighting Equipment; Exterior, Installation of Aircraft (General Specification)
166	3.16.8.3	Exterior Lights

Requirement: Paragraph C-2 - "When applicable, aircraft exterior lighting systems shall contain the light assemblies shown in Table III."

Paragraph D-3b - "Both top and bottom fuselage lights shall be equipped with clear white glass covers as specified in Table III."

Deviation: Special lights may be installed as required and as approved by the USAF.

Reason for Change and Remarks: Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-C-6822(1), dated 6 October 1950 - Clamp; Mounting, 2-Inch Size Instrument, Installation of
167	3.14.3	Instrument Installation

Requirement: Figure 1 - Specifies that clamps are to be mounted 45° from vertical.

Deviation: Clamps shall be installed to obtain maximum density of instruments within the panel.

Reason for Change and Remarks: Space in the panel in very limited and high density instrument spacing is imperative to maintain good vision over the panel.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080, dated 27 December 1950 - Electrical Equipment; Installation of Aircraft. General Specification
168	3.16.4	Equipment - Installation

Requirement: Paragraph 3.1.5(j) - "Ventilation: Adequate ventilation shall be provided. An operating temperature range of -55°C (-67°F) to +70°C (+158°F) has been established as the goal to which the design and manufacture of electrical equipment must be directed. It is required that electrical equipment be installed in such manner that these temperature ranges will not be exceeded under normal operating conditions of the aircraft unless otherwise specified."

Deviation: Temperatures in excess of the limits specified shall be permissible under high speed flight conditions, provided that it is demonstrated that the temperature is of such short duration and of such a value that the equipment shall not be damaged.

Reason for Change and Remarks: The short duration of excess temperature makes damage to equipment extremely unlikely and the weight and compromise of design required to keep the temperature within the specified limits is not warranted.

* * * *

169 3.16.4 Equipment - Installation

Requirement: Paragraph 3.3.1 - "Types. - Circuit breakers shall conform to Specification MIL-C-7079. Circuit breakers above 50 ampere capacity and those required for AC circuits shall be approved by the Procuring Service......"

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   Military Specification No. MIL-E-7080 (Cont)

169   Deviation: Circuit breakers shall conform to Specification No. MIL-C-5809 or shall be a substitute trip-free breaker approved by the USAF. These breakers shall also be used for protection of alternating current circuits.

Reason for Change and Remarks: Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF models.

* * * *

170   3.16.4   Equipment - Installation

Requirement: Paragraph 3.3.2.1 - "Push-pull circuit breakers shall conform to drawing AN3161 and shall be used for circuit protection and emergency contro."

Paragraph 3.3.2.2 - "Switch circuit breakers shall conform to Drawing AN3160, ..."

Deviation: Push-pull breakers shall conform to drawings MS25005 and MS25006, switch breakers shall conform to drawings MS25003 and MS25004 or shall be a substitute trip-free breaker approved by USAF.

Reason for Change and Remarks: Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF models.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-E-7080 (Cont)

170a 3.16.7 Controls

Requirement: Paragraph 3.4.1.4 - "Space shall be provided on each switch panel, containing four or more switches, for the subsequent installation of one spare switch conforming to Drawing AN3022 and one switch conforming to Drawing AN3023."

Deviation: Space may not be available to meet the above requirement.

Reason for Change and Remarks: Maximum amount of space for subsequent switch installation shall be provided. However, due to large amount of instrumentation and switches, and configuration of cockpit it is impractical to comply with above requirement.

* * * *

171 3.16.13 Relays

Requirement: Paragraph 3.6.1 - "Relays shall conform to Specification MIL-R-6106 and the applicable AN drawings."

Deviation: As required, relays may be of a design not covered by AN drawings subject to the removal of the Procuring Agency.

Reason for Change and Remarks: Special problems on this airplane requires the use of nonstandard relays.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
172	3.16.4	Equipment - Installation

Requirement: Paragraph 3.8.1 - "Rheostats shall conform to Specification MIL-R-6749, and are available in various standard capacities as shown on Drawing AN3155."

Deviation: It shall be permissible to use rheostats in accordance with JAN-R-19 and JAN-R-22.

Reason for Change and Remarks: These rheostats are approved and can be obtained in smaller dimensions than the AN3155 rheostats, thereby conserving space in the cockpit.

* * * *

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
173	3.16.2.1 3.16.2.2	Direct Current Power Supply Alternating Current Power Supply

Requirement: Paragraph 3.11.5 - "The installation of remote-driven generators and their drives shall be contingent upon the Procuring Service's approval."

Deviation: The generators shall be remote driven by the cooling air turbine motor.

Reason for Change and Remarks: The number of generators to be driven and the saving in weight make this installation desirable.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memorandum Report No. MCREXP-524-3006, dated 1 December 1950 - "Design of Pressure Refueling Systems For Aircraft."
174	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.4 - "Design Criteria - Refueling." ...."Under these conditions, line sizes in the refueling systems are to be selected such that all tanks theoretically reach the full position simultaneously." Complete refueling in 3 minutes but not exceeding 600 GPM."

Deviation: No special provisions shall be made to insure that both L. H. and R. H. tanks reach full simultaneously. Tank lines shall be designed for a maximum refueling rate of 200 GPM. Complete refueling in 6 minutes but not to exceed 200 GPM.

Reason for Change and Remarks: To save weight and to prevent high pressure build-up in the tank during filling.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memo Report No. MCREXP-524-3006 (Cont)
175	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.5 - "Design Criteria - Defueling - The system shall provide for ground defueling of the airplane at a minimum rate of 200 GPM when suction pressure of 11 psig is applied to the airplane adapter at the inlet of the type D-1 nozzle. When suction is not available, the airplane booster pumps shall be capable of pumping all fuel out of the airplane through the adapter and nozzle but not necessarily at the above rate. Vent lines shall be adequate to allow a defueling of the maximum rate from each tank individually when the above suction is applied without experiencing any negative pressures within the tank."

Deviation: Defueling shall be accomplished by using booster pumps with tanks pressurized by an external source, or by tank pressurization and suction. In the later case the defueling rate shall be not less than 45-50 GPM/side.

Reason for Change and Remarks: Considerable weight savings is realized by not complying with above in that extremely large size line would be required. Also, it is necessary that tanks be pressurized and sequenced for c.g. control.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memo Report No. MCREXP-524-3006 (Cont)
176	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.8 - "Tank Selection - It shall be possible to select any tanks for filling and conversely to avoid filling any tanks."

Deviation: Provisions for tanks to be filled selectively shall not be required.

Reason for Change and Remarks: Fuel from tanks is used in a specific sequence for c.g. control, conversely tanks are filled in the reverse sequence.

* * * *

177 Requirement: Paragraph 3.9 - "Fuel Shut-Off Provisions - For airplanes with provisions for ground refueling only, at least one of the shut-off devices shall be of the "fail closed design."

Deviation: Provisions for "fail closed" control valve shall not be required.

Reason for Change and Remarks: Two means of shut-off are incorporated in the same unit.

* * * *

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memo Report No. MCREXP-524-3006 (Cont)
178	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.14 - "Tank-Filler Caps. - The requirements for a pressure refueling system shall in no way delete existing requirements for normal tank filler caps.

Deviation: Gravity filling requirements shall not be incorporated.

Reason for Change and Remarks: Main fuel tanks may be filled by pressure refueling, (single point) only. This is as established through correspondence between CVAC and WADC. (Ref Convair ltr 6-3490 of 2 July 1952).

* * * *

[redacted]

APPENDIX III-A

The following details and assemblies shall be interchangeable within the definition of Specification AN-I-21.

[redacted] F-102 INTERCHANGEABILITY LIST

1. Elevon assembly
2. Wing tip assembly
3. Wing leading edge assembly
4. Rudder assembly
5. Vertical stabilizer tip assembly
6. Vertical stabilizer leading edge
7. Fuselage tail cone
8. Fuselage movable canopy
9. Fuselage nose radome
10. Fuselage speed brakes
11. Fuselage nose forward of cockpit pressure bulkhead
12. Brake parachute housing cover
13. Windshield glass
14. Main landing gear and removable components
15. Nose landing gear and removable components
16. Power plant installation (quick-change feature)
17. Engine air intake ducts which are not integral with fuselage structure
18. Rocket and missile displacing gear mechanism
19. Ejection seat
20. Control stick assembly
21. Rudder and brake pedal assembly
22. Control system parts such as bell cranks, control arms, walking beams, push-pull rods, eccentric sheaves, shafts, and similar related parts.
23. Temperature regulators
24. Pressure regulators
25. Intercoolers
26. Air turbine motor and gear box assembly
27. Hydraulic system units (exclusive of tubing)
28. Structural access doors
29. Government Furnished Equipment - all items
30. Instrument panel assemblies
31. External OMNI antenna assembly on vertical stabilizer
32. Cockpit console panels

[redacted]

APPENDIX III-B

The following details and assemblies shall be replaceable within the definition of Specification AN-I-21.

F-102 REPLACEABILITY LIST

	ITEM	REASON FOR NOT BEING INTERCHANGEABLE
1.	Wing Assembly	Match drilling required for wing-to-fuselage attach angle. Match drilling and reaming required for spar-to-fuselage attachment.
2.	Vertical Stabilizer Assembly	Match drilling required for stabilizer-to-fuselage attach angle. Match drilling and reaming required for spar-to-fuselage attachment.
3.	Armament Bay Doors	Skin trim at installation
4.	Main Alighting Gear Closure Doors	Skin trim at installation.
5.	Nose Alighting Gear Closure Doors	Skin trim at installation.
6.	Fairings	
7.	Wing and empennage attach fittings with respect to installation on the wing or empennage.	
8.	Sections of wing and fuselage assembled by manufacturing (permanent and semi-permanent) joints.	
9.	Control horns, masts, and brackets where attached by rivets.	
10.	Inspection doors unstressed. Skin trim and drill at installation.	
11.	Canopy transparent panels.	

[redacted]

APPENDIX III-C

NEW AND NOVEL FEATURES

1. The 60 degree delta wing configuration of the proposed design provides superior aerodynamic and structural characteristics for solution of the USAF interception problems of local air defense, general air defense and free-lance defense operation.

2. The wing and tail leading edges and the engine air intake duct lips shall be anti-iced by means of heated air which escapes through porous metal skin on the above surfaces.

3. Deleted.

[redacted]

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[redacted]

DIVISION SAN DIEGO

MODEL F-102A

REPORT ZW-8-002

DATE 1 June 1953

UNCLASSIFIED

TITLE

F-102A

WEIGHT HISTORY

(Revised 1 December 1953)
(Revised 7 January 1954)
(Revised 15 November 1954)
(Revised 1 April 1956)

CLASSIFICATION CANCELED
Authorized By: DD 254 6/10/60
Reclassified By: Dept. Date
W+ Leonard 6 12/22/60

PREPARED BY a. C. Truex
A. C. Truex

GROUP WEIGHTS

REFERENCE

CHECKED BY

APPROVED BY
R. L. Bayless

NO. OF PAGES 31

NO. OF DIAGRAMS

REVISIONS

NO.	DATE	BY	CHANGE	PAGES AFFECTED
1	12-1-53	A.C.Truex	Summary and details brought up to date.	1, 2, 12 thru 15
2	1-7-54	T.J.Moffett	Introduction, Summary & Details revised.	1 through 17
3	11-15-54	C.E.Beddoes	Introduction, Summary & Details revised	1 through 31
4	4-1-56	C.E.Beddoes	Introduction, Summary & Details revised	2, 31 through 49 & Graph

UNCLASSIFIED

GO 241A

[redacted]

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[redacted]

Revised: 1 December 1953
Revised: 7 January 1954
Revised:15 November 1954

INTRODUCTION

This report consists of a summary of the major weight changes that have occurred since the original weight estimate was made. The original proposal gross weight was 22,940 lbs. as shown in Airplane Specification ZD-041 dated 29 December 1950. The first group of changes lists the derivation of the gross weight of 26,404 lbs. as shown in Airplane Specification ZD-8-001 dated 1 December 1952. A second group consists of weight changes occurring up to and including Weight and Balance Status Report #6 dated 1 June 1953.

The gross weights are summarized on pages 1 & 2 details of these totals are listed on subsequent pages.

The take-off center of gravity was 29.3% M.A.C. for the original proposal of Specification ZD-041, 30.9% M.A.C. in Specification ZD-8-001, and was 29.8% M.A.C. as of 1 June 1953.

ADDENDUM (12-1-53)

(Revised 7 January 1954)
(Revised 15 November 1954)

A third group of changes has been added for the period covered by Weight and Balance Status Reports #7 through #10. Report #10, dated 1 October 1953, was the last issued prior to the configuration change, at which time the gross weight was 28,237 lbs.

A fourth group covers the same period as Status Report #11, dated 1 December 1953, and derives the gross weight of 28,963 lbs. The changes in body configuration and addition of cambered leading edge are included and grouped separately.

A fifth group reflects the period of Status Reports 12 through 14. Status Report #14, dated 1 April 1954, is the last report written on the 8-90 airplane, the gross weight of which was 29,937 at this time.

[redacted]

ised: 1 December 1953
ised: 7 January 1954
ised:15 November 1954

(Revised 7 January 1954)
(Revised 15 November 1954)

The sixth group of changes arrives at the 8-10 light weight airplane. It sums up the weight savings presented in detail in Report ZW-8-008 and derives a gross weight of 28,061 lbs. as of 1 July 1954.

The seventh group is the final step to arrive at a new Model Specification ZD-8-003, for the 8-10 airplane. It matches Status Report #16, dated 1 September 1954. It lists reversals of decisions in regards to some ZW-8-008 weight saving items and it reveals additional weight decreases. The gross weight of 28,145 lbs. is now considered the Spec. Weight.

The summary on pages 1 and 2 has been brought up to date, and the details are shown on pages 12 through 31.

The take-off center of gravity was at 29.5% M.A.C. prior to the configuration change, and is at 29.4% M.A.C. as of 1 September 1954.

ADDENDUM (4-1-56)

An eighth group of changes has been added to reflect E.C.P. 1007.

The Specification Gross Weight as of 3 September 1954 was 28145 lbs., however E.C.P. 1007 was issued to change the Gross Weight to 27500 (the current weight at the time the E.C.P. was issued) so as to correlate the Weight and Balance Status Report No. 19 dated 1 December 1954, the actual weight of the "Hot Rod" Airplane being used for demonstration, and the F-102A Model Specification.

The ninth group of changes covers the period from the revised Spec. Weight of 27500 to the Actual Weight Report - First Airplane which quotes the weight of 27454 for Airplane Serial No. 53-1791. The weight changes for this period may be found in Status Reports Nos. 20 thru 24.

The tenth group reflects the changes submitted in Status Reports Nos. 25 and 26. It arrives at a Gross Weight of 27704 lbs. [redacted] to provide a direct [redacted]-023.

[redacted]

ADDENDUM (4-1-56)

Group eleven arrives at the current weight at the time of this revision (1 April 1956). Details of this group may be found in Status Report No. 27. The Gross Weight at this time is 27884 lbs. with the center of gravity at 29.3% M.A.C.

[redacted]

ANALYSIS
PREPARED BY
CHECKED BY
REVISED BY

CONVAIR SAN DIEGO

PAGE 1
REPORT NO. ZW-8-002
MODEL F-102A
DATE 1 June 1953

[redacted]ed: 1 December 1953
ed: 7 January 1954
ed: 15 November 1954

	LBS.
Gross Weight of Original Proposal Airplane Specification ZD-041 dated 29 December 1950	22,940
Government Requested Changes and G.F.E. Overweight (For details see Part A, page 3)	+ 2,147
Convair Changes (For details see Part B, page 7)	+ 1,317
Gross Weight of Revised Airplane Specification ZD-8-001 dated 1 December 1952	26,404
Government Requested Changes and G.F.E. Overweight (For details see Part C, page 9)	+ 746
Convair Changes (For details see Part D, page 10)	+ 639
Gross Weight as of Weight and Balance Status Report No. 6 dated 1 June 1953	27,789
Government Requested Changes and G.F.E. Overweight Status Report No.'s 7 through 10. (For details see Part E, page 12)	+ 193
Convair Changes, Status Report No.'s 7 through 10. (For details see Part F, page 13)	+ 255
Gross Weight as of Weight and Balance Status Report No. 10, dated 1 October 1953. (This is the last report prior to the configuration change)	28,237
Government Requested Changes and G.F.E. Overweight, Status Report No. 11. (For details see Part G, page 15)	- 237
Convair Changes, Status Report No. 11. (For details see Part H, page 16):	(+ 963)
New Body Configuration and Cambered Leading Edge	+ 1,054
Other Changes	- 91
Gross Weight as [redacted] No. 11,	28,963

FORM 1012

[redacted]

sed: 1 December 1953
sed: 7 January 1954
sed:15 November 1954

	LBS.
Government Requested Changes and G.F.E. Overweight Status Reports 12 through 14 (For Details see Part I, Page 18)	+ 621.6
Convair Changes: Status Reports 12 through 14 (For Details see Part J, Page 20)	+ 352.6
Gross Weight as of Weight and Balance Status Report No. 14 dated 1 April 1954	29,937
Government Requested Changes and G.F.E. Overweight Status Report No. 15 (For Details see Part K, Page 25)	- 924.1
Convair Changes Status Report No. 15 (For Details see Part L, Page 26)	- 952.1
Gross Weight as of Weight and Balance Status Report No. 15 dated 1 July 1954	28,061
Government Requested Changes and G.F.E. Overweight Status Report No. 16 (For Details see Part M, Page 29)	+ 369.9
Convair Changes Status Report No. 16 (For Details see Part N, Page 30)	- 285.9
Gross Weight as of Weight and Balance Status Report No. 16 dated 1 September 1954 Specification ZD-8-003 dated 3 September 1954	28,145
Government Requested Changes and G.F.E. Overweight Status Reports 17 thru 19 (For Details see Part O, Page 31)	- 25.6
Convair Changes Status Reports 17 thru 19 (For Details [redacted]	- 619.4

[redacted]

F-102A WEIGHT HISTORY SUMMARY

		LBS.
Gross Weight as of Weight and Balance Status Report No. 19 dated 1 December 1954 Specification ZD-8-003 revised by E.C.P. 1007		27500
Government Responsibility Changes & GFAE Variation Status Reports 20 thru 24 (For Details see Part Q, Page 40)	+	286.9
Convair Changes, Status Reports 20 thru 24 (For Details see Part R, Page 41)	-	332.9
Gross Weight as of Weight and Balance Status Report No. 24 dated 1 July 1955 Actual Weight of First F-102A Airplane		27454
Government Requested Changes & G.F.A.E. Overweight Status Reports 24 and 25 (For Details see Part S, Page 45)	-	21.0
Convair Changes, Status Reports 25 and 26 (For Details see Part T, Page 45)	+	271.0
Gross Weight as of Weight and Balance Status Report No. 26 dated 1 December 1955		27704
Government Requested Changes & G.F.A.E. Overweight Status Report No. 27 (For Details see Part U, Page 49)	+	183.0
Convair Changes, Status Report 27 (For Details see Part V, Page 49)	-	4.0
Gross Weight as of Weight and Balance Status Report No. 27 dated 1 February 1956		27884

[redacted]

UNCLASSIFIED

Revised: 1 December 1953
Revised: 7 January 1954
Revised:15 November 1954

[redacted]

DISCUSSION OF MAJOR CHANGES

Part A

Government Requested Changes & G.F.E. Overweight, Status Report No.'s A through J.

1. Fuselage enlargement and redesign due to increase in missile length and span. Due to this increased size of missiles, the installation was completely revised. Formerly the missiles were installed in one bay directly beneath the engine and the rockets were carried in a separate bay forward of the missiles. Rather than increase the fuselage diameter with the resulting adverse effect on performance, the missiles were installed in two tandem bays with rockets also in each bay. Because of the missile arrangement the fuselage was increased in length 20 inches at Station 300. In addition, controls, tubing, wiring, etc. increased due to the added fuselage length. The total increase was estimated at 130 lbs. + 130

2. For increased maneuverability while taxiing, the Air Force requested that nose wheel steering mechanism be added. This was requested in WADC letter WCSWF/NMR/nlt dated 10-15-51. + 29

3. Change from J-67 engine of original Airplane Specification ZD-041 to J-57 engine of current airplane Specification ZD-8-001. Revised weight of J-57 engine vs. original weight of J-67 engine. The J-67 basic engine weight was based on the information in Advance Engine Spec. AC-177 for Wright Model TJ-32C1 (YJ-67-W-1) dated 2 August 1951 showing 3,880 pounds. An estimated 550 lbs. was added for the afterburner. (3880 + 550 = 4430 lbs.) Latest information in Pratt & Whitney Preliminary Installation Design Data Handbook (dated 2-12-52 revised 5-16-52) lists the J-57-P-11 engine with afterburner and less air inlet screens as weighing 4825 lbs. for the partial titanium engine. (4825 - 4430 = 395 lbs. increase). The engine oil allowance in Useful Load was changed from 119 lbs. for the J-67 engine to the current 50 lbs. for the J-57, a saving of 69 lbs. The total effect of the partial titanium J-57 engine in lieu of the YJ-67-W-1 engine was +395 - 69 = 326 lbs. increase. + 326

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part A (Cont'd)

Government Requested Changes & G.F.E. Overweight, Status Reports A Through J, (Cont'd)

4.	The hydraulic system was revised in accordance with requests in WADC letter WCSWF/NMR/nlt dated 10-16-51. This included removal of the emergency hydraulic system pump from the engine and provision of auxiliary electric power for the pump. (Note: Later a change was made to an auxiliary air turbine drive, see page 11)	+ 70
5.	Revised weights due to MX-1179 Radar requirements. The original concept of the MX-1179 gear was that it would be a complete integral unit designed to fit into the F-102 airplane. Later information received from Hughes and listing later weights, showed that many individual units would be supplied which therefore required interconnecting cabling and individual mounting provisions. Also the electrical power requirements were learned which included the necessity of holding frequencies to much closer tolerances than anticipated. These changes resulted in an overall weight increase in Electrical and Electronics Group weights of 255 lbs.	+ 255
6.	Increase in Windshield glass thickness to approximately one inch, for protection from debris, increased the weight 36 lbs. Reference WADC letter WCSWF/NMR/nlt dated 10-15-51 which requested a separate piece of 1 inch armor glass inside the canopy.	+ 36
7.	The number of rockets carried in the basic loading was increased from 19 to 24 as requested in WADC letter WCSWF/NMR/nlt dated 10-15-51. This included 88 lbs. for the rockets and 17 lbs. for provisions.	+ 105
8.	A hot air anti-icing system was added in lieu of provisions only as requested in WADC letter WCSWF/NMR/nlt dated 11-7-51.	+ 80
9.	Original information indicated that the weight of Government furnished MX-1179 gear plus the missile was complete. However, a later breakdown from Hughes listed missile launchers as separate items. A weight allowance of 10 lbs. each was made for these items.	+ 60

[redacted]

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DISCUSSION OF MAJOR CHANGES (Cont'd)

Part A (Cont'd)

Government Requested Changes & G.F.E. Overweight, Status Reports A Through J, (Cont'd)

10.	Revised information from Hughes listed the MX-904 missile weight as 125 lbs. each vs. the 106.5 lbs. each originally quoted.	+ 111
11.	Revision to fuselage and armament provisions to provide for maximum fire-power in the alternate all rocket armament condition, utilizing 12 rockets per missile in lieu of 4. Reference CVAC letter TMH:FBW:br 6-1843 dated 4-24-52. (This results in a maximum rocket load of 96 2.75" FFAR when no missiles are carried).	+ 275
12.	Increase in airplane structure to provide strength for increased gross weight resulting from government requested changes.	+ 315
13.	Increase in dive brake effectiveness as requested in WADC letter WCSWF/NMR/nlt dated 10-16-51. (Original proposal utilized extension of original rocket compartment door as a dive brake. New arrangement provides three hinged dive brakes located on the fuselage afterbody.)	+ 178
14.	The airplane spec. revision of March 1952 included a brake parachute in accordance with verbal request of Air Force representatives.	+ 42
15.	Revised information from Hughes showed electronic characteristics of the radome as dictated by the MX-1179 gear which resulted in a change in the radome material and an increase in its weight.	+ 46
16.	Information from Pratt & Whitney indicated that above 40,000 feet altitude the fuel-oil cooler furnished with the J-57, would not cool the oil sufficiently due to the reduced fuel flow. Therefore, an engine auxiliary oil cooling system was added.	+ 36
17.	At the Mock-Up Board Meeting of November 1952 a battery enclosing cover was added as RFA No. 56.	+ 15

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DISCUSSION OF MAJOR CHANGES (Cont'd)

Part A (Cont'd)

Government Requested Changes & G.F.E. Overweight, Status Reports A Through J, (Cont'd)

18.	At the Mock-Up Board Meeting of November 1952 a radar recording device was added to the radar equipment as RFA No. 37	+ 10
19.	Remainder and miscellaneous small changes total to plus 28 lbs.	+ 28
	TOTAL PART "A"	+ 2,147 lbs.

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DISCUSSION OF MAJOR CHANGES (Cont'd)

Part B.

	Convair Changes, Status Reports A Through J.	LBS.
1.	Increase in wing weight due to correction of arithmatical error in original wing skin calculations (416 lb.) revised distribution of and increase in loads, and increase in design temperatures due to aerodynamic heating (84 lb.)	+ 500
2.	The original elevon weight was based on XF2Y-1 weights. Subsequent increase of XF2Y-1 elevons indicated an increase of 158 lbs.	+ 158
3.	The engine air inlet ducts were re-estimated, based on revised pressures and temperatures. This indicated an increase of 99 lbs. due mainly to the flat sides of the ducts used to minimize airplane drag.	+ 99
4.	The Air Turbine Motor, as originally proposed, did not have sufficient capacity. Type 70-1 is now being used. The presently proposed installation requires also that a fan be added to cool the turbine motor.	+ 78
5.	Based on wind tunnel tests, a chordwise fence was added to the upper surface of each wing to eliminate chordwise center of pressure shift and resulting decrease in stick force per "g". (This is an insurance item and may be removed following flight tests).	+ 30
6.	Information, from wind tunnel tests, indicated that the directional stability was less than originally estimated. As a result, the design side tail loads were increased. The fuselage frames and longerons, and the vertical tail structure were increased to provide the necessary strength.	+ 187
7.	Design temperatures from aerodynamic and engine heating dictated the use of titanium for the aft fuselage frames in lieu of aluminum alloy. (Minimum gauge did not allow reduction in weight of titanium).	+ 46
8.	Until chemical treatments for corrosion resistance can be incorporated on the interior structure, prime paint has been added [redacted] lbs.	+ 38

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Revised: 1 December 1953
Revised: 7 January 1954
Revised: 15 November 1954

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DISCUSSION OF MAJOR CHANGES (Cont'd)

Part B (Cont'd)

Convair Changes, Status Reports A Through J, (Cont'd)	LBS.
9. The basic fuselage structure has been increased in weight due to the accumulated effect of the addition of several access doors. This includes doublers and skin gauge increases.	+ 82
10. The original proposed fuel system, was not approved by the Air Force. The revised system increased the weight 44 lbs.	+ 44
11. Yaw and pitch dampers were added to improve lateral and longitudinal dynamic characteristics.	+ 55
TOTAL PART "B"	+ 1,317

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DISCUSSION OF MAJOR CHANGES (Cont'd)

Part C

Government Requested Changes & G.F.E. Overweight, Status Reports 1 Through 6.

		LBS.
1.	The first detailed weight breakdown of the MX-1179 electronic equipment received from Hughes totals 1740 lbs. This results in an increase of 599 lbs. This overweight was discussed in CVAC letter TMH: ACT:dmh #6-1599, dated 4-8-53.	+ 599
2.	Information from Pratt and Whitney representatives has indicated that the partial titanium J-57 engine will not be available for installation in early F-102 airplanes. Therefore, the weight of an all steel engine, as noted in "Pratt and Whitney Preliminary Installation Design Data Book", dated 2-12-52, revised 5-16-52, has been incorporated with a weight increase of 250 lbs. (This weight will be deleted eventually)	+ 250
3.	Latest information from Hughes has indicated an additional weight increase of the MX-904 missiles from 125 lbs. to 130 lbs. each.	+ 30
4.	In order to provide a better personnel escape system for operation at higher speeds, the ejection equipment has been changed to include a Type M-3 catapult in lieu of Type M-5 and the addition of a Type M-1 thruster. (Reference ECP #26).	+ 23
5.	The interim electronic gear MG-3 has replaced the MX-1179 radar equipment at a weight saving of 150 lbs.	- 150
6.	Remainder and miscellaneous small changes total to -6 lbs.	- 6
	TOTAL PART "C"	+ 746 lbs.

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DISCUSSION OF MAJOR CHANGES (Cont'd)

Part D

Convair Changes, Status Reports 1 Through 6.	LBS.
1. For production and inspection reasons, additional access doors have been added in the wing.	+ 39
2. Revised weights of missile bay structure show an increase of 121 lbs. which is due mainly to air loads with doors open and to increase in design temperatures.	+ 121
3. As a result of structural tests, a portion of the fuselage skin has been increased in gauge to eliminate wrinkles.	+ 21
4. The wing structure has been increased due to redistribution of loads within the structure and revision of fuel tightening.	+ 120
5. Originally, a wing drag angle was assumed in the fuel tight area with a rubber strip in leading and trailing edges. Current design includes a drag angle the full length of the wing.	+ 28
6. The duct supplying air to the Air Turbine Motor did not deliver sufficient air, and therefore a second duct was added.	+ 27
7. Heat exchanger exit ducts are to be made of titanium rather than aluminum due to design temperatures.	+ 21
8. Original weights of several items of electrical power equipment were based on an early estimate by Jack and Heintz. A later estimate from Jack and Heintz, confirmed by an estimate from Westinghouse, has indicated a 30 lbs. increase.	+ 30
9. As a result of structural tests, the fuselage fitting for attaching wing spar 5 has been increased in strength with a slight increase in spar 5 weight.	+ 14
10. Wing rib at buttock line 39 has been simplified in design.	- 7

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Revised: 1 December 1953
Revised: 7 January 1954
Revised: 15 November 1954

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part D (Cont'd.)

Convair Changes, Status Reports 1 Through 6, (Cont'd.)		LBS.
11.	The engine air inlet has been designed for fabrication from steel as a result of higher temperatures and pressures than originally estimated.	+ 65
12.	Addition of lightening holes in engine air duct frames saves approximately 37 lbs.	- 37
13.	Missile displacement frames are to be made of welded steel construction in lieu of aluminum forgings. This change is made to hold launching mechanism deflection to a minimum.	+ 28
14.	A revised estimated weight on the ejection seat has been received from the vendor.	- 10
15.	Vendor information has been received on weight of air conditioning equipment and results in a 13 lb. increase over original allowance.	+ 13
16.	Because of wing bending, together with elevon deflection, the elevon has been split spanwise to prevent the trailing edge from failing in compression. This change increases the airplane weight 21 lbs. but is much lighter than would be required to make a single piece elevon strong enough to withstand the loads.	+ 21
17.	The trailing edge extrusion on the elevon has been changed from magnesium to aluminum due to skin design temperatures.	+ 16
18.	Increase in stiffness of main landing gear doors.	+ 43
19.	Revised weight of missile launcher attaching parts.	+ 10
20.	Change from electrical drive emergency hydraulic system to ram air turbine drive.	+ 25
21.	Remainder and miscellaneous small changes total to 51 lbs.	+ 51
	TOTAL PART "D"	639 lbs.

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Revised:1 December 1953
Revised:7 January 1954
Revised:15 November 1954

[redacted] (Cont'd.)

Part E

Government Requested Changes and G.F.E. Overweight, Status Report No.'s 7 through 10.

		LBS.
1.	Missile launchers, previously estimated at 10 lbs. each are now estimated at 26 lbs. each (Useful Load).	+ 96
2.	Addition of electric heater to water supply. (Ref. E.C.P. CAC-F-102-30).	+ 4
3.	Relocation of antenna hand control from instrument panel to flight control handle (Ref. E.C.P. CAC-F-102-34).	+ 9
4.	MG-3 electronic equipment has increased 79 lbs. according to information from Hughes. This overweight and relocation of components by vendor are responsible for an addition of 8 lbs. in contractor furnished mountings. (This item is subsequently nulified by Part G, Item 1)	+ 87
5.	Miscellaneous Changes.	- 3
	TOTAL PART "E"	+ 193

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DISCUSSION OF MAJOR CHANGES (Cont'd)

Part F

	Convair Changes, Status Reports 7 through 10.	LBS.
1.	Due to increased shear loads from the wing, in addition to the 5 minute removal time for the A.T.M. unit, the access door to this unit has been beefed up structurally and larger quick opening latches installed.	+ 30
2.	Actual vs. calculated weight of wing spar number 3 (120.3 vs. 108.3)	+ 12
3.	Calculated vs. layout weight of landing gear fairing (123 vs. 106 lbs.)	+ 17
4.	Emergency ram air pump door calculated vs. estimated weight.	+ 13
5.	Addition of automatic fast idle feature to insure sufficient power to operate electronic equipment.	+ 8
6.	Revised estimate for rocket tube blast pans shows an increase from 29 to 42 lbs.	+ 13
7.	Reinforcement of missile displacement gear has resulted in an increase from 253.3 to 295.3 lbs.	+ 42
8.	Addition of perforated duct inside wing and tail leading edges for conducting heated air for anti-icing. (This item is subsequently deleted as a result of Part H, Item 3)	+ 22
9.	Structural tests have shown necessity of using bolts rather than rivets for fastening wing-fuselage drag angle to wing.	+ 11
10.	Revised calculated weight of gastite corner forgings (56 vs. 45 lbs.)	+ 11
11.	Actual vs. estimated weight of the 6 missile displacement gear actuating cylinders (69 vs. 60 lbs.)	+ 9
12.	Revised estimate for missile auxiliary cooling system ducts (12 vs. 4 lbs.)	+ 8

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part F (Cont'd.)

Convair Changes, Status Reports 7 through 10, (Cont'd.)	LBS.
13. Actual vs. layout weight of main landing gear (390 vs. 416 lbs.) and nose gear (96 vs. 107 lbs.)	- 37
14. Increased size and quantity of switches, relays, etc. in armament electrical system has resulted in an increase of 20 lbs.	+ 20
15. Miscellaneous design changes, actual weight changes, etc.	+ 76
TOTAL PART "F"	+ 255

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Revised: 1 December 1953
Revised: 7 January 1954
Revised:15 November 1954

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Part G

Government Requested Changes and G.F.E. Overweight, Status Report No. 11.	LBS.
1. MG-3 electronic equipment reduction per information from Hughes (- 81 lbs.), and resultant 7 lbs. saving in contractor provisions.	- 88
2. G.F.A.E. harnesses for MG-3 equipment have increased 47.3 lbs., causing an estimated increase of 44.7 lbs. in contractor-furnished harnesses.	+ 92
3. Use of partial titanium J-57-P11 engine (4825 vs. 5075 lbs.)	- 250
4. Use of 24 amp-hour battery in lieu of 36 amp-hour	- 24
5. Change in canopy design adds glass area for improved vision at request of Air Force (Ref. E.C.P. CAC-F-102-28).	+ 12
6. Addition of wiring running along missile displacement arms due to elimination of break-away plug design.	+ 14
7. Addition of external fuel tank provisions at request of Air Force (Ref. E.C.P. CAC-F102-10).	+ 8
8. Miscellaneous government responsibility changes.	- 1
TOTAL PART "G"	- 237

[redacted]

Part H

Convair Changes, Status Report No. 11.	LBS.
New Body Configuration and Cambered Leading Edge Changes:	(+ 1054)
1. The body configuration has been changed to reduce transsonic and supersonic drag. Basically, this consists of lengthening the body approximately 74" and decreasing the diameter locally at the wing.	+ 964
2. A cambered leading edge and reflex tip have been incorporated to reduce subsonic drag.	+ 151
3. Wing and tail anti-icing have been deleted in the new configuration.	- 102
4. Engine air inlet ducts have been designed integral with the body to improve manufacture of the airplane. This change allows the armament mechanism to be changed to a "nutcracker" type in lieu of the previous parallel displacing "A" frames.	+ 76
5. The engine bleed duct has been moved from inside the body contour to outside on the top centerline in a fairing running forward from the fin leading edge to the canopy.	- 35
Other Convair Changes:	(- 91)
6. Wing skin will be fabricated from 96" wide panels in order to reduce splices required.	- 50
7. Relocate brake chute attaching location forward of canted bulkhead.	- 20
8. The forging for wing spar number 5 will be increased in size, thus eliminating a splice.	- 17
9. Accumulation of many small weight saving items which it has been agreed [redacted]t stage of the cur	- 100

[redacted]

Part H (Cont'd.)

Convair Changes, Status Report No. 11 (Cont'd.)		LBS.
10.	Revised estimate for missile bay shrouding and installation provisions for electronic equipment, due to air loads in the missile bay with doors open at high speeds, and also a review of access requirements.	+ 32
11.	As a result of vibration tests made on YF-102 airplane number 1, the fin attaching bulkheads in the aft body section have been stiffened.	+ 16
12.	The IFF equipment has been moved up into the fin leading edge because of engine heat in the aft compartment.	+ 10
13.	Wiring estimate increase due to additional information on wiring requirements for armament items.	+ 9
14.	Provisions for 16 foot drag chute in lieu of 14 1/2 foot chute.	+ 7
15.	Miscellaneous design changes, actual weight changes, etc.	+ 22
	TOTAL PART "H"	+ 963

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Revised: 1 December 1953
Revised: 7 January 1954
Revised: 15 November 1954

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Part I	LBS.
Government Requested Changes and G.F.E. Overweight, Status Reports 12 through 14	(621.6)
1. Use of AN/APX-25 Transceiver in lieu of AN/APX-6 Transceiver. Remainder of this IFF system remains AN/APX-6 equipment (Ref. E.C.P. CAC-F102-55).	+ 5.9
2. To provide for several indicators as used in electronic equipment, it has become necessary to add a B-7 amplifier to the J-2 Compass system. (Ref. E.C.P. CAC-F102-56)	+ 6.5
3. Change from Type M-1 to Type M-3 Canopy Thruster (Ref. E.C.P. CAC-F102-26)	- 3.0
4. During the Configuration Conference held at Wright Field in January 1954, requirements for the following items of equipment were made firm. Therefore, in order to reflect the weight of a tactical airplane, the weights are incorporated herein.	
IFF equipment APX-25 in lieu of APX-6 (Change to APX-25 transceiver had been made in E.C.P. 55)	+ 40.0
Tape recorder in lieu of camera for recording of electronic data	+ 20.0
Combustion (self contained) starter in lieu of air starter	+ 55.0
Addition of Data Link and Ground Position Indicator electronic equipment	+150.0
Addition of Airborne Moving Target Indication equipment	+ 25.0
Addition of the Automatic Instrument Landing System	+ 25.0

The above changes [redacted] approximately [redacted]

[redacted]

Part I (Cont'd.)

Government Requested Changes and G.F.E. Overweight, Status Reports 12 through 14

		LBS.
5.	A very preliminary estimate for Data Link and Ground Position Indicator (+150 lbs.) was added in Status Report No. 12. Later information shows the Data Link installation as weighing 127.6 lbs. Since the G.P.I. has now been deleted, -22.4 lbs. are subtracted to result in the current estimate for Data Link Installation.	- 22.4
6.	Since the J-57-JT3-N Engine will replace the J-57-P11 on the tactical airplane, the weight increase due to this change is being incorporated	+ 215.0
7.	In addition to the MG-3 C.S.T.I. equipment, the Contractor's Weight Group has erroneously included the weight of a Pilots Assist Installation. This weight is now being deleted.	- 25.5
8.	The latest weight report received from Hughes Aircraft Co. shows an increase in the weight of cabling supplied by them for the MG-3 equipment.	+ 70.2
9.	Since the weight of the cabling supplied by the Contractor for the MG-3 equipment is based on the G.F.A.E. cabling weight, change 8 above necessitates a corresponding weight change for the C.F.E. cabling.	+ 61.0
10.	Variation in weight of G.F.A.E. Equipment	- 1.1
	TOTAL	+ 621.6

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vised: 1 December 1953
vised: 7 January 1954
vised:15 November 1954

Part J

	LBS.
Convair Changes, Status Reports 12 through 14	(352.6)
1. Concurrent with the revised body shape change, the missile displacing gear was changed to a "nutcracker" geometry (at the same allowance of 237 lbs.) in order to minimize a large weight increase that was pending. A layout weight has totaled 349 lbs. including design for greatly increased loads and stiffness requirements. Studies indicate that the present tubular design is near optimum.	+112.0
2. The wing and tail anti-icing system had been deleted based on testing and studies to date. The Air Force to date does not accept these data as sufficient proof that the anti-icing system can be deleted. Pending further tests and discussions with the Air Force, the anti-icing system is added back into the weights.	+102.2
3. Test data from engine shut downs on the test stand have shown that temperatures on the structure are not critically high without residual heat doors. Therefore, these doors are deleted.	- 61.0
4. If the engine is throttled below full power at high speeds, engine air is spilled over the inlet causing duct instability and the possibility of heavy vibrations. To eliminate this, "blow out" doors have been added in the aft duct section which will open at high mach numbers when the throttle is retarded.	+112.0
5. The missile bay doors have been stiffened so that side loads with doors open are carried in the doors. This permits a reduction in the missile bay beams resulting in a net decrease.	- 47.8
6. The outer (non-load carrying) glass and vinyl in the windshield and canopy have been reduced in thickness and the frame members have been changed to a more efficient design utilizing extrusions.	- 25.0

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vised: 1 December 1953
vised: 7 January 1954
vised:15 November 1954

Part J

Convair Changes, Status Report 12 through 14 (Cont'd.)

		LBS.
7.	The structural access door to the ATM compartment has been redesigned from a single door to a double door with a removable center beam.	- 15.0
8.	Vibrations encountered in the engine air ducts on the test stand showed need to increase the intake duct skin.	+ 85.5
9.	In order to reduce pressure drop in the fuel system and to provide for possible future elimination of the booster pumps, the tubing has been increased in diameter.	+ 7.6
10.	Missile auxiliary items of the MG-3 gear formerly mounted in the missile bay have been reallocated aft to an aft electronic bay just forward of the main wheel well. This reduces the electronic equipment shrouding (-9.0 lbs.) and adds access doors and a partition (+17.4 lbs.). This change moves the c.g. approximately 0.2% M.A.C. aft.	+ 8.4
11.	Due to a revision of the air ducts immediately aft of the cockpit area, the electronic gear in this area can now be mounted on the airplane structure eliminating the need for the rack and elevator.	- 9.3
12.	Armament control wiring, estimated on the basis of #18 and smaller wires, has calculated with approximately 40% of the wires being #16.	+ 6.9
13.	An additional access door has been provided in the wing fuel tank area for improved access to the fuel tight corners.	+ 4.5
14.	Added splice in wing leading edge spar due to spars length exceeding the capacity of the oven for Scotchweld treatment.	+ 4.2

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ised: 1 December 1953
ised: 7 January 1954
ised:15 November 1954

Part J (Cont'd.)

Convair Changes, Status Report 12 through 14 (Cont'd.)

		LBS.
15.	By using two pressure regulators in lieu of one regulator and a dump valve, the design p.s.i. for canopy is limited, thereby permitting a further reduction in thickness of inner-ply glass (without pressure testing each panel) in addition to the 15 lbs. saving reported in Part "H".	- 2.5
16.	It is considered necessary to add a "Pitch-G-Limiter" as a safety item to prevent damage to the aircraft in case of malfunction of the elevator control system.	+ 6.5
17.	Missile actuation loads have increased the vertical stiffeners and diagonal supports of the Missile Bay Beams.	+ 42.0
18.	Revised design which uses bulb seal in lieu of leaf seal permits reduction of fire seal.	- 7.4
19.	Tests have indicated that is possible to delete the pressure operated check valve in the fuel lines between tanks 1 and 2.	- 4.0
20.	Until flight test proves the need for water injection in the Air Conditioning System, it is being deleted from the airplane.	- 41.0
21.	To insure proper operation of the surface control feel system, anti-icing of the "Q" intake is added.	+ 3.0
22.	Information exchanged between the Contractor and Hughes results in elimination of some components of the Pitch and Yaw System.	- 8.2
23.	Use of magnesium castings in lieu of built-up aluminum for the speed brakes reduces their weight from 49.4 to 39.4 lbs.	- 10.0
24.	Use of a pressure regulator at the engine permits use of a lighter gauge for the engine bleed ducts.	- 20.0

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vised: 1 December 1953
vised: 7 January 1954
vised:15 November 1954

Part J (Cont'd.)

Convair Changes, Status Report 12 through 14 (Cont'd.)

		LBS.
25.	Redesign of the Main Landing Gear Doors permits a reduction in weight.	- 11.5
26.	The Contractor has received approval from the Air Force to use aluminum plumbing in oil lines from engine to cooler.	- 14.0
27.	Difficulty encountered in retracting the main landing gear during test flights results in increasing the diameter of the actuating cylinder from 2 1/8 to 2 5/8 inches.	+ 15.4
28.	Due to revised body shape, it is possible to reduce the number and size of screws attaching the wing drag angle resulting in a reduction of thickness of the angle.	- 6.0
29.	Improved design of the honeycomb wing tip results in a weight reduction.	- 10.0
30.	Category 1 R.F.A. Items 7, 12, 27, 34 and the fuselage portion of Item 15 requested by USAF Development Engineering Inspection held at the Contractor's facilities on February 9 and 10, 1954, have been incorporated in this Status Report.	+ 3.7
31.	As a result of wind tunnel tests, Aerodynamics has requested that a fence be added at B.L. 84 to extend from a point 7 inches aft of the cambered leading edge to a point 19 inches forward of spar #3, and the forward section of the existing fence at B.L. 154 be extended around the cambered leading edge.	+ 24.5
32.	The rudder feel and trim components have been moved up in the fin closer to the actuator valve and follow-up system to eliminate rudder movement due to fin and torque tube deflections. This results in a smaller external fairing (improved aerodynamics) and larger cutouts in fin ribs, skin and spars for installation and access.	+ 6.0

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sed: 1 December 1953
sed: 7 January 1954
sed:15 November 1954

Part J (Cont'd.)

Convair Changes, Status Report 12 through 14 (Cont'd.)

		LBS.
33.	As a result of weighing the Contractor furnished portion of the MG-3 cabling for the YF-102 airplane; the F-102 cabling weight was revised.	+ 64.9
34.	Miscellaneous changes due to calculations, actual weights, etc.	+ 36.6
	TOTAL	352.6

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sed: 1 December 1953
sed: 7 January 1954
sed: 15 November 1954

			LBS.
Part K			
Government Requested Changes and G.F.E. Overweight, Status Report 15			(-924.1)
1.	Installation of warning light system to indicate loss of one or both Hydraulic Systems (Reference ECP CAC-F-102-87)		+ 2.0
2.	Installation of PT-7 engine pressure ratio indicator and associated equipment (Reference ECP CAC-F-102-85)		+ 19.0
3.	Change ZPX-27 Waveguide from G.F.A.E. (-3.0 lbs.) to C.F.E. (+ 3.0 lbs.)		0
4.	Miscellaneous G.F.A.E. weight variation		- 30.4
5.	At the request of the U.S.A.F., a magnetic stand-by compass is being added		+ 1.0
6.	Latest information indicates that the airplane structure must be designed to 7.0 g load factor at sea level to allow for a high speed pull-out. Assuming a "stretch" program of designing to 6/7 of 7.0 g loads and locally increasing the strength as indicated in the static test program an allowance of 150 lbs. is made.		+150.0
7.	R.F.A. Items 15 and 29 requested by U.S.A.F. Development Engineering. Inspection held at the Contractor's facilities on February 9 and 10, 1954 has been incorporated		+ 4.5
8.	Government Responsibility weight saving items per Report ZW-8-008		
	A. Change in Basic Ground Rules:		(-1070.2)
	1. J-67 Requirements eliminated: (Items AS, 1, 67, 106, and 109)	221	
	2. Anti-Icing Elimination: (Items AS; 4)	125.6	
	B. Elimination of Conservatism: (Items AS [redacted] 45, 50,54, 115,		

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vised: 1 December 1953
vised: 7 January 1954
vised: 15 November 1954

LBS.

Part K (Cont'd.)

Government Requested Changes and G.F.E. Overweight, Status Report 15 (Cont'd.)

8. Government Responsibility weight saving items per Report ZW-8-008 (Cont'd.)

C. Improved Methods and Materials: (Items AS: 3) 7.0

D. Additional Deviations to Handbook Requirements: (Items AS: 6, 8, 10, 13, 37, 72, 107) 72.5

E. Design Cleanup (Second Look): (Items AS: 11, 21, 22, 24, 31, 33, 38, 48, 49, 61, 105) 226.5

F. Additional Test Data (Similation Data, Etc.): (Items AS: 56) 35.0

TOTAL - 924.1

Part L

Convair Changes, Status Report 15 (- 952.1)

1. Based upon the actual weight of electrical wiring on the YF-102 airplane, the estimated weight of the F-102 wiring is revised by 75 lbs. + 75.0

2. The vendor for the auto-stabilization equipment has submitted to the Contractor a revised weight estimate - 3.0

3. Original design for the external wing fuel tanks assumed that when they were dropped they would fall free of the airplane. It appears necessary now to jettison them by explosive; therefore, it is mandatory that the wing structure be reinforced. + 11.1

4. To maintain a constant fuel supply, a sump around the booster pump is being provided (6.8 lbs. in Weight Empty, 14.0 lbs. in Useful Load) + 20.8

5. As a result of te [redacted] has been reinforced + 8.4

FORM 1012

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ised: 1 December 1953
d: 7 January 1954
ed:15 November 1954

Part L (Cont'd.)

Convair Changes, Status Report 15 (Cont'd.)

			LBS.
6.	To reduce drag, the external configuration of the airplane has been modified by lengthening the nose (122.0 lbs.) and adding a large fuselage-wing fairing (103.0 lbs.)		+ 225.0
7.	To improve the thrust of the engine, the air intake ducts have been increased in area and have been revised to normal shock inlet		+ 25.0
8.	Added longerons on armament doors to carry loads across blast pan cutouts		+ 10.3
9.	Installed centering spring and cam mechanism to reduce sensitivity of nose gear steering		+ 4.7
10.	Miscellaneous changes		+ 28.2
11.	Contractor Responsibility weight saving items per Report ZW-8-008		
	A. Change in Basic Ground Rules:		(-1357.6)
	1. J-67 Requirements eliminated: (Items CD; 3,4,18,19,20,32,36,38,39 49,54,56,59,65,71,78,83,91,104,108, 110,141)	531.5	
	B. Elimination of Conservatism: (Items CD; 1,6,7,8,14,15,22,24,26,35,43,52, 62,67,72,81,84,87,88,97,98,102,105,106,107, 114,121,128,129,130,133,138,142,146,149,150)	223.6	
	C. Shop Practice (Machining, Etc.): (Items CD; 2,5,13,21,25,41,46,47,48,80,86, 147)	86.0	
	D. Improved Methods and Materials: (Items CD; 33,53,123,144)	13.4	
	E. Additional [redacted] (Item		

[redacted]

vised: 1 December 1953
vised: 7 January 1954
vised:15 November 1954

		LBS.
Part L (Cont'd.)		
Convair Changes, Status Report 15 (Cont'd.)		
11. Contractor Responsibility weight saving items per Report ZW-8-008 (Cont'd.)		
F. Design Clean-Up (Second Look): (Items CD: 11,29,31,40,42,44,45,50,51,58, 60,63,66,74,75,82,85,90,92,93,95,99,101,103, 112,113,118,124,126,127,136,140,145,148)	427.1	
G. Additional Test Data (Similation Data, Etc.): (Items CD: 34,37,79,120)	12.0	
H. Review of Purchased Parts: (Items CD: 100,109)	20.0	
TOTAL		- 952.1

[redacted]

FORM 1012

[redacted]sed: 1 December 1953
sed: 7 January 1954
sed:15 November 1954

Part M

		LBS.
Government Requested Changes and G.F.E. Overweight Status Report 16		(+369.9)
1. Hughes MG-3 system - reflects report dated 31 May 1954		- 7.5
2. By Air Force request:		+420.6
A. Fuel flowmeter system reinstated	+ 8.6	
B. AMTI portion of MG-3 deleted	- 19.4	
C. Revised estimate for 7.0 g symmetrical load factor at sea level in lieu of 5.33 g (part of ECP #209) 90 lbs. vs. 150 lbs.	- 60.0	
D. 7.0 g symmetrical load factor at all altitudes in lieu of sea level only (part of ECP #209)	+160.0	
E. All steel engine vs. partial Titanium J-57	+250.0	
F. Main gear tires - 18 ply rated vs. 14 ply	+ 10.8	
G. ARN-14 and ARN-18 in lieu of ARN-31	+ 45.5	
H. ARN-12 in lieu of ARN-32	+ 7.6	
I. R.F.A.'s (see introduction) numbers 21,45, 47,58,59 and 62	+ 9.5	
J. Separate Data Link antenna added	+ 8.0	
3. High pressure pneumatic system compressor deleted		- 32.3
4. 24 Amp. Hr. battery in lieu of 36 Amp. Hr.		- 21.0
5. Added Sundstrand drive frequency regulator		+ 7.0
6. Miscellaneous and G.F.A.E. weight variations		+ 3.1
	TOTAL	+369.9

Part N

Convair Changes, Status Report 16	(-285.9)
1. Spar #5 inboard attach fitting reduced	- 15.8
2. Additional machining of wing skins and fittings	- 17.6
3. Revision to honeycomb wing fences	- 10.6
4. Wing ribs, rail[redacted]	- 20.6
5. Miscellaneou[redacted]	-192.4

[redacted]

vised: 1 December 1953
vised: 7 January 1954
vised: 15 November 1954

Part N (Cont'd.)

Convair Changes, Status Report 16 (Cont'd.)

			LBS.
6.	Honeycomb trailing edge elevon structure utilized	-	11.0
7.	Intermediate electronic compartment door cutout beams deleted	-	8.0
8.	Fuselage hoist fitting moved aft (Sta. 349 vs. 310)	-	10.0
9.	Engine air ducts and boundary layer ducts redesigned including duct skin gage reduction	-	55.2
10.	Due to main gear up-latch redesign the starter air connection is relocated into the wheel well and the shear panel is redesigned	-	12.3
11.	Combination of speed brakes with drag chute doors and use of single lower aft longeron vs. dual	-	68.5
12.	Thicker windshield installed for Nesa de-ice vs. de-fog	+	9.0
13.	Partial substitution of magnesium skin for aluminum (Sta. 482-553)	-	6.0
14.	Missile bay door bulkheads changed to aluminum vs. magnesium	+	18.0
15.	Redesign of elevon, rudder and throttle control system	-	12.3
16.	Fuel vent system redesign and single line fuel tank pressurization system	-	18.5
17.	Elimination of missile bay cooling ducting	-	19.5
18.	Vendor changes	-	25.2
19.	Redesign of cabin pressure regulator and safety valve	-	5.0
20.	Replacement of Burndy electrical connectors	-	13.0
21.	Automatic electrical power control switching deleted	-	5.7
22.	Remainder of missile bay equipment shrouding deleted	-	12.7

[redacted]

ised: 1 December 1953
sed: 7 January 1954
sed: 15 November 1954

Part N (Cont'd.)

Convair Changes, Status Report 16 (Cont'd.)

		LBS.
23.	At the time the Model Specification ZD-8-003 was signed there were several items which could result in large weight increases which were unresolved. It was felt that some allowance should be made for these unresolved items therefore 250 pounds was added. This allowance was reduced by 36 pounds to offset items added during the specification conference at Wright Field.	+ 214.0
24.	Missile launcher attach bolts size increase	+ 6.0
25.	Addition of angle of attack transducer	+ 7.0
	TOTAL	- 285.9

Part O

Government Requested Changes and G.F.E. Overweight Status Reports 17 thru 19

1.	In Part G the addition of provisions for external fuel tanks (E.C.P. 10) was added at a cost of 8.0 lbs. This E.C.P. has been revised and resubmitted and the balance is being added at this time	+ 16.5
2.	Hughes MG-3 Equipment Weight Reports show a decrease in wiring of 62.5 lbs. and 3.5 lbs. in equipment	- 66.0
3.	Change in Missile as reported by Hughes	+ 24.0
4.	It has been determined that the frequency regulator for the Sundstrand Drive will not be needed	- 7.0
5.	Miscellaneous changes & G.F.A.E. variation	+ 6.9
	TOTAL	- 25.6

[redacted]

Part P | LBS.

Convair Changes, Status Reports 17 thru 19

		LBS.
1.	Flight test data on missile firing reveals that when the missiles are fired a blast of contaminating dust from the missile sprays the entire surface of the airplane, with the exception of the vertical tail. Since this dust is highly corrosive it will be necessary to paint all exposed surfaces (wing, fuselage and armament bay) with corrosive resistant enamel.	+ 27.0
2.	The webs and stiffeners of the aft tank ribs have been reduced in gauge and legs of stiffeners have been trimmed	- 8.8
3.	By redesigning the wing bulkhead at B.L. 84 so that it would attach directly to the spar clip it has been possible to eliminate the parts that formerly were used to bridge the gap that existed between the two	- 4.7
4.	The wing to fuselage attachment has been revised to reduce weight. Bolts heads have been reduced in area and thickness and thread length shortened. Washers and shims have been changed from steel to aluminum	- 6.2
5.	It has been possible to reduce the gauge of the upper and lower doublers on Spar #6 from .064 to .057 since the wing skin is .007 inches closer to the spar as a result of decreasing the overall depth of the wing.	- 5.0
6.	Because of increased wing tip loads it is necessary to increase the skin gauge in the wing trailing edge box from .057 to .064, add an .057 doubler under the upper outboard trailing edge skin and increase the area of the doublers around the wing trailing edge access doors.	+ 22.6
7.	By redesigning the wing interbox ribs to incorporate integral spar attachments it is possible to eliminate separate attachment clips. This change is made at a cost to manufacturing convenience in order to save weight	- 4.7
8.	Final simulator data [redacted] wing spars. Of the 55.0 lbs. [redacted] at all altitude [redacted] shows that only [redacted]	- 10.2

[redacted]

Part P (Cont'd.)

Convair Changes, Status Reports 17 thru 19 (Cont'd.)

		LBS.
9.	Final simulator data permits a decrease in weight of the wing spar material exclusive of that added for 7 g condition.	- 36.3
10.	Due to later loads information and elimination of conservatism the gauge of the Elevon ribs has been reduced and lightening holes added.	- 7.0
11.	The original saving of 7.0 lbs. quoted in Item AS-8 of Report ZW-8-008, which proposed the use of millable head Jo-Bolts in lieu of screws for wing to fuselage drag angle attachment, was a conservative estimate. It is known now that 11.0 lbs. may be saved.	- 4.0
12.	The wing to fuselage drag angle has been reduced in gauge from .081 to .064. This has been made possible by eliminating the conservatism attached to the original design.	- 3.5
13.	The barrel of the elevon inboard horn fitting has been extended 3.5 inches because the control system configuration would not permit the moving of the elevon actuator outboard into the "yellow canary" fairing	+ 5.8
14.	Revised design of the Elevon trailing edge (Ref. Item CD-8) permits substitution of .020 skins for .051 and .040 in the area where the skin attaches to the trailing edge wedge. It is also possible to eliminate local doublers.	- 7.0
15.	The bulkhead at Fuselage Sta. 481.7 has been redesigned utilizing built-up sheet in lieu of forgings. Magnesium web has been substituted for aluminum. This is partial accomplishment of Item CS-8 of Contractor's Report ZW-8-008.	- 15.0
16.	The fuselage skin from Sta. 443 to 482 has been reduced in weight. The .045 aluminum skin has been changed to .040 magnesium and the .051 aluminum reduced to .045.	- 5.3
17.	The lower shear panel in the missile bay area has been changed from aluminum to magnesium.	- 3.2
18.	Rerouting of the [redacted] run is between fr at Sta. 316 makes frame and others	- 5.9

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DISCUSSIONS OF MAJOR CHANGES (Cont'd.)

Part P (Cont'd.)

Convair Changes, Status Reports 17 thru 19 (Cont'd.)

		LBS.
19.	Reduction of gauges and change from aluminum to magnesium of the frames and skins forward of Sta. 122 results in a weight saving	- 4.6
20.	The fuselage frames from Sta. 481.7 to the tail cone have been reduced in depth from 2.5 inches to 2.0 and the gauge has been changed from .045 to .040.	- 4.5
21.	Titanium has replaced steel for the aft engine mount beams	- 6.8
22.	By utilizing machined extrusions in lieu of built up sheet for the lower longeron in the area from Sta. 553 to 630, it is possible to show a decrease in weight	- 6.2
23.	Changing to magnesium for the outer fuselage skin between Sta. 192.9 (canted) to Sta. 217 affords a weight reduction.	- 7.2
24.	The radome attachment inner frame has been changed from steel to titanium.	- 2.6
25.	Wind tunnel tests show that the nose wheel door must be opened 165° in lieu of the 90° proposed in item CD-79	+ 6.1
26.	The relay control box formerly for armament door actuation only, now incorporates relays for other armament operations.	+ 3.0
27.	The aerodynamic fairing at the aft end of the fuselage has been redesigned. The portion forward of the canted bulkhead has been changed to be an integral part of the fuselage. In the section aft, the frames have beeen redesigned and the skin gauges reduced.	- 22.4
28.	Skin and doublers of the dorsal fairing from Sta. 317 to 491 has been changed from aluminum to magnesium.	- 1.5
29.	The shear panel between upper longerons from Sta. 197 to 217 has been lightened by reducing the .051 aluminum skin to .040 magnesium and the .040 aluminum doublers to .032 magnesium. This is in addition to Item CD-37	- 2.2

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DISCUSSIONS OF MAJOR CHANGES (Cont'd.)

Part P (Cont'd.)

Convair Changes, Status Reports 17 thru 19 (Cont'd.)

		LBS.
30.	By utilizing machined extrustions for lower single longeron from Sta. 405 - 553 in lieu of sheet stock a weight reduction is accomplished.	- 4.7
31.	The canopy hinge attachment has been reduced in weight by: substituting magnesium for aluminum skin and doublers, reduction in stiffener gauges and deletion of locator assembly.	- 4.8
32.	An access door was previously installed in the missile bay in order to service the lower portion of the heat exchanger. The heat exchanger has recently been relocated to the center electronic compartment permitting elimination of this access door.	- 5.2
33.	Additional weight has been saved on the forward radar doors by combining lower latch support casting, using built-up sheet in lieu of castings, hold open rods have been deleted from the doors and are now ground handling equipment, and by using smaller latches.	- 5.8
34.	The layout weight of the canopy actuator box installation shows additional savings on item CD-52 due to clean-up of design and reduction of gauges.	- 3.4
35.	Redesigning to J-57 loads only has made possible the reduction in both size and gauge of the missile door hinges and caps. (This saving is in addition to Item CD-56). Scallops were also machined into these members between attaching points. This redesign saved 19 lbs. Miscellaneous redesign eliminated an additional 15 lbs. in the doors.	- 34.0
36.	Due to final loads being less than estimated as well as rivets being used in lieu of bolts, the missile actuation attachment fittings on the missile bay beams have been reduced.	- 4.7
37.	Redesign of main gear door mechanism allows use of smaller, shorter door actuating cylinders.	- 1.6

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DISCUSSIONS OF MAJOR CHANGES (Cont'd.)

Part P (Cont'd.)

Convair Changes, Status Reports 17 thru 19 (Cont'd.)

	LBS.
38. It is necessary to "beef-up" the main landing gear doors in order to decrease deflection and support the gear which rests upon them in retracted position.	+ 6.0
39. There has been additional savings on the tail cone due to changing from titanium to aluminum of some skin and frames, reduction in gauge of other skin and formers and changing from web type to truss type formers. The above reductions were made possible as a result of reduction in temperature and loads which had been based upon the 8-90 configuration.	- 18.0
40. A portion of Item CS-13 is being accomplished by using honeycomb in lieu of built-up aluminum for the structural engine access door.	- 5.5
41. Redesign of the Missile Bay Beams to J-57 loads and reduced temperatures permits a reduction in cross sectional areas of the upper and lower caps, the vertical stiffeners, and the diagonal support at Sta. 310.	- 38.8
42. Due to the present fin stiffness it is possible to reduce the weight of the belt-frame at sta. 643.	- 4.6
43. By redesigning the structure around the forward radar compartment doors from Sta. 46.8 to 63.9 it has been possible to save additional weight.	- 6.2
44. Pressure tests on the canopy reveals deflection in the section aft of the glass due to the latch design. Rather than redesign the latch mechanism, it will be cheaper in weight to reinforce the canopy around the pivot arm.	+ 6.0
45. The speed brake doors and supporting structure has been reduced due to the following: (a) Reduction in loads for the blow back condition on the doors. (b) Lower temperature due to providing a gap between the tail cone and and brake chute housing.	

[redacted]

DISCUSSIONS OF MAJOR CHANGES (Cont'd.)

Part P (Cont'd.)

Convair Changes, Status Reports 17 thru 19 (Cont'd.)

	LBS.
(c) Using magnesium skin for brake chute enclosure. Use magnesium castings for upper and lower door and cylinder support fittings.	- 9.6
46. Final layout weights of the "yellow canary" fairing reveals additional savings. This is attributed to making the fairing integral and reduction in side loads and skin temperatures.	- 33.6
47. An accumulation of many small changes made by the vendor of the main gear struts results in a weight increase	+ 16.5
48. The rudder control valve and cylinder has been redesigned incorporating the servo shut-off valve as an integral part, and providing for mounting the servo actuator as part of a unit. This results in a saving in hoses, tubing and fittings.	- 1.5
49. A recent drawing change on Pratt & Whitney drawing No. 208301 indicated an engine C.G. shift of 4.3 inches aft. Since this shift would move the airplane C.G. aft, an actual check was made on the first engine available which substantiated the drawing change.	----
50. Recent tests reveals fatigue failure on the vertical post channels and back-up angles on the flat beaded intake duct skin. It is necessary to increase the thickness of the channels and angles.	+ 4.3
51. The engine oil breather line has been redesigned, shortening it and using reduced gauges.	- 2.0
52. Development of a self-priming fuel pump, which will permit constant fuel flow when changing from a positive to negative angle of attack (or vice-versa), has reached the stage where the Contractor feels it will be available for late 8-10 airplanes. Installation of this pump will permit removal of the sump around the present pump and the attendant trapped fuel.	- 28.3

[redacted]

DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part P (Cont'd.)

Convair Changes, Status Reports 17 thru 19 (Cont'd.)

		LBS.
53.	It has been determined that the exhaust duct for the starter can be eliminated without adverse effects.	- 2.4
54.	Original estimate for ground starter connection was based on locating the connection in the fuselage surface. Relocation to the wheel well allows the use of a shorter duct and attendant weight saving. (This is in addition to saving previously reported in the Fuselage).	- 1.5
55.	The Ram Air Turbine has been redesigned to a lighter unit. The fan shell has been deleted.	- 2.7
56.	When it was decided to install the Ram Air Turbine without a housing it was possible to use a smaller door, resulting in lesser loads. Also the Turbine now hinges from the airplane rather than from the door. As a result of these changes the door hinges have been reduced considerably.	- 5.4
57.	The cooling provisions for parameter setting relay assemblies are being deleted as a result of studies which reveal that the ambient air is sufficient cooling	- 2.0
58.	By using a new type of dielectric material for the DME and APX and OMNI antennas it has been possible to reduce their weights.	- 14.0
59.	The missile displacement drag arms have been changed from steel to aluminum (Ref. Item CS-30)	- 15.0
60.	Test show that the latching mechanism for the rocket blast pans must be reinforced to insure proper closing of the pans.	+ 4.5
61.	Miscellaneous relays for armament actuation are now included in relay control box for armament door operation.	- 3.0
62.	Because the missile displacement gear actuators have been redesigned to lower loads, the trunnions to which they attach may also be decreased.	- 17.7

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part P (Cont'd.)

Convair Changes, Status Reports 17 thru 19 (Cont'd.)

		LBS.
63.	A joint meeting of the Contractor and Hughes Aircraft Company bared the advisability of grounding the armament firing circuitry while the airplane is being serviced to prevent possible inadvertent firing.	+ 3.7
64.	Although manual seat adjustment was proposed in the interest of weight it has been determined that this adjustment must be electrical	+ 3.5
65.	The weight of the Anti-G suit pressure regulator was duplicated in the records.	- 2.0
66.	By rerouting lines and redesigning supports it was possible to decrease the weight of the oxygen system.	- 4.2
67.	Weber Aircraft, manufacturer of the Pilot's Seat and Ejection Tracks, have submitted a calculated weight in [redacted] which the seat is 6.5 lbs. lighter and the track 6.8 lbs. lighter than the original estimate.	- 13.3
68.	The foot warmer system in the cockpit has been deleted until proved necessary. It is believed it will not be necessary with the new type cabin distribution ducts.	- 2.0
69.	The vendor of the Nesa Anti-Icing Control Box believes he can reduce the weight appreciatively.	- 4.8
70.	By utilizing the brake parachute housing for carrying the speed brake support loads it is possible to eliminate weight in the speed brake supporting structure.	- 5.0
71.	As a result of recent tests on existing aircraft where the unusable fuel was determined to be greater than previously estimated, it has been deemed necessary to raise the amount on the airplanes of this configuration.	+ 70.0
72.	Layouts vs. estimates. As the detail redesign has progressed and layouts made, it has been found that even more weight can be removed than was originally believed possible.	- 275.1
73.	Miscellaneous Changes	- 31.2
	TOTAL	- 619.4

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part Q

**Government Responsibility Changes & GFAE Variation
Status Reports 20 thru 24**

		LBS.
1.	Hydraulic Accumulator Pressure Gauges were eliminated in the Weight Reduction Study Report ZW-8-008 (Item AS-103). New lighter gauges have again been incorporated in the design.	+ 0.8
2.	Redesign of the Oxygen Filler System as per Item AS-33 of ZW-8-008 has not been approved as functionally satisfactory.	+ 1.0
3.	The weight increase for the two items above will be offset by decreasing the amount of contingency weight provided for items of this nature. (Ref. Weight and Balance Status Report No. 16).	- 1.8
4.	Combustion starter in lieu of air starter (ECP 1013)	+ 75.0
5.	Permanent installation of ejection mechanism, fuel lines, and electrical equipment for droppable fuel tanks (ECP 1028)	+ 83.8
6.	Computing type optical sight in lieu of fixed type (ECP 1061 & 1063)	+ 47.9
7.	Replacement of J-8 Attitude Gyro with the MM-2 Attitude Indicating System (Reference ECP CAC-F-102-1015)	+ 22.5
8.	Installation of positive type actuation of the light in the landing gear control handle to warn the pilot to extend the gear prior to landing. (Reference ECP CAC-F-102-1020)	+ 2.1
9.	Fiscal Year 1955 Program G.F.A.E. Changes (Reference ECP CAC-F-102-1035)	- 2.4
10.	Canopy Defrosting and Defogging provisions in accordance with MIL-T-5842 (Reference ECP-F-102-1001)	+ 4.5
11.	The CTCI Board which convened at the Contractors Facility, 26 - 29 May 1955, submitted a request for alteration No. 85 which asked for installation of a liquid type oxygen system in lieu of gaseous type. (Reference ECP CAC-F-102-1057)	+ 12.2
12.	The most recent report on the MG-10 System dated 30 April 1955 shows an increase.	+ 14.8

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part Q (Cont'd.)	LBS.
Government Responsibility Changes & GFAE Variation Status Reports 20 thru 24 (Cont'd.)	
13. G.F.A.E. Weight Variation	+ 26.5
TOTAL	+ 286.9

Part R

Convair Changes Status Reports 20 thru 24

1. To provide better take-off characteristics, the main Landing Gear has been moved forward 11.0 inches in the extended position (E.C.P. CAC F102-1010). In the retracted position the gear remains in its' former position.	+ 15.0
2. The weight increase due to moving the Landing Gear is being offset by decreasing the amount of contingency weight provided for items of this nature (Ref. Weight and Balance Status Report No. 16).	- 15.0
3. Weight and Balance Status Report No. 18 added 27.0 lbs. for missile blast protection paint on the wing, fuselage, intake ducts and armament bay. Further firing tests show the need to add it to the tail surface.	+ 2.0
4. Wing Spar No. 5 (at Sta. 584) has been redesigned to be an integral forging, thereby eliminating the splice at the inboard attach fitting with a resultant weight saving.	- 11.1
5. As a result of the skewed landing gear configuration, the bosses and spiders for the landing gear trunnions in Spar No. 3 and 4, and the lower outboard intermediate box skin have been redesigned with a net weight reduction	- 4.5

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part R (Cont'd.)

Convair Changes Status Reports 20 thru 24 (Cont'd.)

		LBS.
6.	It has been necessary that, in skewing the main landing gear, the connecting links from gear to fairing be reduced from two to one. This imposes an additional torque on the fairings. As a result of this additional torque, and reduction in depth of the door, reinforcement must be added to the door structure.	+ 12.6
7.	It has been necessary to reinforce the fuselage frame at Sta. 643 to provide for increase fin bending on the TF-102A airplane.	+ 1.2
8.	Previously the side longeron was stabilized by the missile trunnion support but, owing to redesign, this structure is no longer sufficient. Therefore, stabilizing braces must be added at Sta. 259, 273, and 286.	+ 1.5
9.	Due to the inability to redesign the Auto Flight System as contemplated in Item 42 of ZW-8-008 Weight Reduction Study, it has been necessary to redesign the frame at Sta. 560 as well as the Elevon Cylinder Door and to add intercostals in this area.	+ 4.0
10.	Lower fuselage skin around the lower intermediate Radar has been changed from .072 to .064.	- 1.3
11.	Lower Intermediate Radar Pan changed from aluminum to magnesium.	- 0.9
12.	The aft end of the afterbody fairing has been sealed off; eliminating reverse air flow and providing aerodynamic shape.	+ 2.5
13.	Due to longitudinal sensitivity at high speeds, it has been found necessary to install, within the elevon system, a means of changing the ratio between the movement of the control stick and the surface movement. While immediate flight tests will use a mechanical and electrical system, the ultimate system is intended to incorporate a non-linear mechanical linkage.	+ 4.0
14.	Redesign and relocation of the Elevon Follow-Up system potentiometers has afforded a weight reduction.	- 3.9
15.	Flight tests show the [redacted]	+ 2.0

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part R (Cont'd.)

Convair Changes Status Reports 20 thru 24 (Cont'd.)

		LBS.
16.	Elevator automatic trim servo system is being added to prevent possible reversal of elevon control during transitional flight and compensate for attitude change when speed brakes are extended.	+ 13.4
17.	By redesigning the Frame Corner Fittings of the Engine Intake Duct Lip so they are formed from sheet stock on the Hi-Draw Press in lieu of machined billet, it has been possible to reduce their weight.	- 1.5
18.	Diaphragm added to the Engine Inlet Duct at Sta. 413.	+ 3.5
19.	Extensive redesign of the Engine Shroud is necessary due to inadequancies revealed in handling and from experience on the Test Stand. The aft portion of skin is being increased from .012 to .016. External stiffeners are used instead of integral beads and the transition duct and diaphragm baffle are being reinforced. Also a 3" extension has been added to improve air flow.	+ 15.0
20.	Redesign of the Ram Air Turbine Actuating Cylinder to the reduced 8-10 loads permits a weight reduction.	- 1.8
21.	Actual weight of the hydraulic tubing and fittings on the 8-90 Airplanes indicate that the estimated weight of the tubing on this series is high, therefore the estimate is being revised.	- 24.2
22.	Actual weight of the electrical wiring on the 8-90 Series Airplanes indicate that the estimated weight of the wiring for this Series (8-10) is low, therefore the estimate is being revised at this time.	+ 29.2
23.	By redesigning the Electronic Feed-thru at the bulkhead at Sta. 405 it has been possible to realize a weight reduction.	- 2.0
24.	Nose Wheel-Well Equipment has been redesigned to afford the same protection, but to use less framework, less fabric, and fewer fasteners.	- 2.5
25.	Ignitor Grounding System has been changed to ground directly from the Ignitors in lieu of from the Intervalometers.	- 1.9

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part R

Convair Changes Status Reports 20 thru 24

		LBS.
26.	Flight tests conducted for missile launching reveals that debris from the missile when fired strikes the bulkhead at Fuselage Sta. 405.75 causing large dents in the web. To protect the bulkhead sheets of .047 plastic will be mounted on its forward face to receive the impact of the missile debris.	+ 6.1
27.	Original weight allowance for Rain Clearing Duct Insulation was based on the use of fabric covered blankets, however, due to Spec. requirements, it will be necessary to use Inconel covered insulation which is impervious to the hydraulic oil that may be present.	+ 2.6
28.	Actual vs. Calculated Weights and Miscellaneous Changes. The largest item in this catagory is Wing Machined Skins -43.2 lbs.	- 245.7
29.	One item showing an increase when weighed is the contractor furnished wiring for the MG-10 Electronic System. This increase is attributed to the lack of information on the Electronic Equipment at the time when the wiring weights were estimated. This weight increase occurs at an average location 158 inches forward of the airplane C.G. moving the C.G. 0.3% forward.	+ 100.0
30.	Actual determination of unusable fuel on the first airplane shows a weight of 154 lbs. rather than the 130 lbs. previously carried.	+ 24.0
31.	Trapped oil for this airplane is 21 lbs. in lieu of 25 lbs.	- 4.0
32.	Since the Gross Weight determined by this group of changes reflects the actual weight of the airplane, the contingency which has been carried to offset unexpected weight increases is deleted.	- 197.2
33.	Unaccountable Underweight based on airplane actual weight.	- 54.0
	TOTAL	- 332.9

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part S

Government Requested Changes & G.F.A.E. Overweight Status Reports 24 & 25

		LBS.
1.	Change from 24 2.75 inch rockets to 36 2.00 inch rockets.	+ 29.0
2.	Installation of larger nozzle actuators by Pratt & Whitney on J-57-P-23 Engine.	+ 50.0
3.	Actual weights of J-57-P-23 Engines	- 100.0
4.	Addition of a pneumatic emergency speed brake operation to deploy the brake parachute in event of failure of the speed brake hydraulic system. (Reference RFA No. 45 of CTCI Board Memorandum Report No. MCPHFC-M-356)	+ 3.1
5.	Installation of recirculating valve for the constant speed drive oil system to allow unrestricted attitude flight (ECP 1087)	+ 6.0
6.	Addition of battery for ARC-34 emergency use.	+ 10.0
7.	Replace lanyard type with mechanical linkage for arming seat catapult (ECP 1084)	+ 1.9
8.	The most recent report on the MG-10 System shows a decrease of 9.6 lbs.	- 13.6
9.	G.F.A.E. Weight Variation.	- 7.4
	TOTAL	- 21.0

Part T

Convair Changes, Status Reports 25 & 26

1.	Revision of ground air conditioning system to balance the air flow between the cockpit and the electronic compartment compatible with ground equipment by the addition of a solenoid valve in the cabin press regulator sensing line	+ 1.0

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

		LBS.
	Part T (Cont'd.)	
	Convair Changes, Status Reports 25 & 26 (Cont'd.)	
2.	Redesign nose wheel well curtains by replacing fasteners with zipper.	+ 2.6
3.	In order to meet structural requirements, it has been necessary to add reinforcement to MG-10 nose racks.	+ 5.3
4.	Silastic type sealer replaces diaphragm type to provide a more satisfactory pressure seal around the canopy.	- 2.5
5.	Delete engine right hand surge bleed duct - not required with P-23 engine (ECP 1068)	- 4.7
6.	Addition of fourth air bottle. Present indications are that three air bottles may be insufficient to afford combustion starter start after opening the missile bay doors (ECP 1013)	+ 24.6
7.	Use a smaller filter for radome anti-icing to save weight	- .8
8.	Use of titanium vs. steel for the elevon split fitting	- 3.0
9.	Redesign missile door hinge gap fairing using sheet metal instead of extrusion to prevent damage experienced in service.	+ 3.2
10.	Increase skin gage and core density of honeycomb wing tip as a result of structural tests.	+ 4.6
11.	Addition of reinforcement straps to Spar #6 to provide sufficient strength to meet design requirements.	+ 2.0
12.	Change skin of main landing gear wing fairings from .020 magnesium to .040 aluminum as a result of flight test failure.	+ 6.0
13.	Added cap area to door frames of forward radar doors due to increased airloads.	+ 5.0
14.	Reinforce certain areas in the nose section due to indications from wind tunnel and actual flight tests that greater airloads are encountered in some flight conditions than previously calculated.	+ 25.0
15.	Simplified aft cone of the "Yellow Canary" fairing.	- 2.4

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part T (Cont'd.)

Convair Changes, Status Reports 25 & 26 (Cont'd.)

		LBS.
16.	Addition of side slip transducer to prevent excessive yaw at high roll rates.	+ 3.0
17.	Delete one of two accelerometers that serves both the Pitch "G" limiting and trim servo systems. Both systems may now use the same accelerometer after minor modification to their design	- 2.3
18.	Remove the wedge at the intake duct convergence to eliminate "buzz".	- 4.3
19.	Replace all Aeroquip Type 601 hose assemblies used in hydraulic and high pressure pneumatics systems with MS 28741 hose assemblies as a result of cold weather tests at Eglin Air Force Base.	+ 5.5
20.	Replace metal feed-thrus with rubber boots for electrical harness installations at Sta. 217 and 405.	- 2.0
21.	Use fibreglass cloth instead of metal covered insulation on upper bleed air duct.	- 3.0
22.	Replacement of present refrigeration unit with proposed lighter unit (21 lbs. vs. 34 lbs.)	- 13.0
23.	Improvement of armament control system for safer working condition for ground crew.	+ 6.7
24.	Provide Engine Shroud with greater structural integrity	+ 4.7
25.	Redesign center electronic compartment door to accommodate new antenna installation.	+ 7.9
26.	Extension of engine duct leading edge ramp to eliminate "buzz" encountered at high speeds.	+125.5
27.	Addition of two fuel booster pumps to allow unrestricted maneuvers at low fuel quantities.	+ 56.9
28.	Addition of jet pump system for ground cooling of electronic equipment.	+ 8.5

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part T (Cont'd.)

Convair Changes, Status Reports 25 & 26 (Cont'd.)

		LBS.
29.	Increase area of Speed Brakes to provide better braking effect, Change from sheet metal build-up to magnesium casting.	+ 8.0
30.	Provide 1/4 open canopy provisions.	+ 0.7
31.	Change from honeycomb structure to built-up sheet metal fin tip	+ 4.0
32.	Increase gauge of outer skin on honeycomb fin tip to relieve load on adhesive which bonds the skin to the core.	+ 4.0
33.	Increase speed of armament launcher operation	+ 7.5
34.	Provide speed brake tie-in with trim servo system	+ 3.6
35.	Change skin panel Sta. 443 - 482 from magnesium to aluminum and increase gauge.	+ 5.5
36.	Change in material of radome	+ 11.0
37.	Addition of insulation blanket around engine accessory section to permit removal of Pratt and Whitney heat shield	+ 7.0
38.	Miscellaneous drawing changes, corrections and refinements	+ 6.7
39.	Since the Gross Weight determined by this group of changes reflects the actual weight of airplane no. 10 the unnaccountable underweight of this airplane is included.	- 47.0
	TOTAL	+ 271.0

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DISCUSSION OF MAJOR CHANGES (Cont'd.)

Part U

Government Requested Changes & G.F.A.E. Overweight Status Report No. 27

		LBS.
1.	Part S reported 6.0 lbs. for installation of recirculating valve for the Constant Speed Drive Oil System (ECP 1087). — This was an early estimate before the ECP was firm. Current information shows this change to be a total of 11.0 lbs. - an increase of 5.0 lbs.	+ 5.0
2.	Incorporate Modified Ejection Seat (ECP 1097)	+ 24.5
3.	Revision to ECP 1100 causes an increase - Emergency Operation of Speed Brakes and Drag Chute Pneumatic System. See Status Report 26.	+ .5
4.	Incorporate Big Tail (ECP 1092) In order to improve the stability of the F-102A Airplane 26.84 sq. ft. of area have been added to the fin. (95.14 sq. ft. vs. 68.3 sq. ft.)	+ 153.0
	TOTAL	+ 183.0

Part V

Convair Changes. Status Report 27

1.	Part T included 25.0 lbs. to reinforce the Nose Section. It has now been determined that only 20.0 lbs. is necessary.	- 5.0
2.	Replace MS 28741 hoses with Teflon in the Hydraulic and Pneumatic Systems.	- 5.5
3.	Miscellaneous	+ 6.5
	TOTAL	- 4.0

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A

ADDED DIVE BRAKES	170
REVISED ENGINE WEIGHT	685
REVISED RADAR WEIGHT	140
ADDED 5 ROCKETS	105
MISC. GOV. REQUESTED CHANGES	281
INCREASE IN STRUCTURE FOR ABOVE	278
WING AERODYNAMIC HEAT AND ESTIMATING ERROR	750
REMAINDER	278
TOTAL	+2,687

B

INCREASE IN TAIL LOADS	125
IMPROVE MAINTENANCE	82
REVISE FUEL SYSTEM	44
REMAINDER	153
TOTAL	+404

C

REVISED RADAR WEIGHT	599
NON-TITANIUM ENGINE	250
REVISED MISSILE WEIGHT	30
MISC. GVAC & VENDORS	99
TOTAL	+978

D

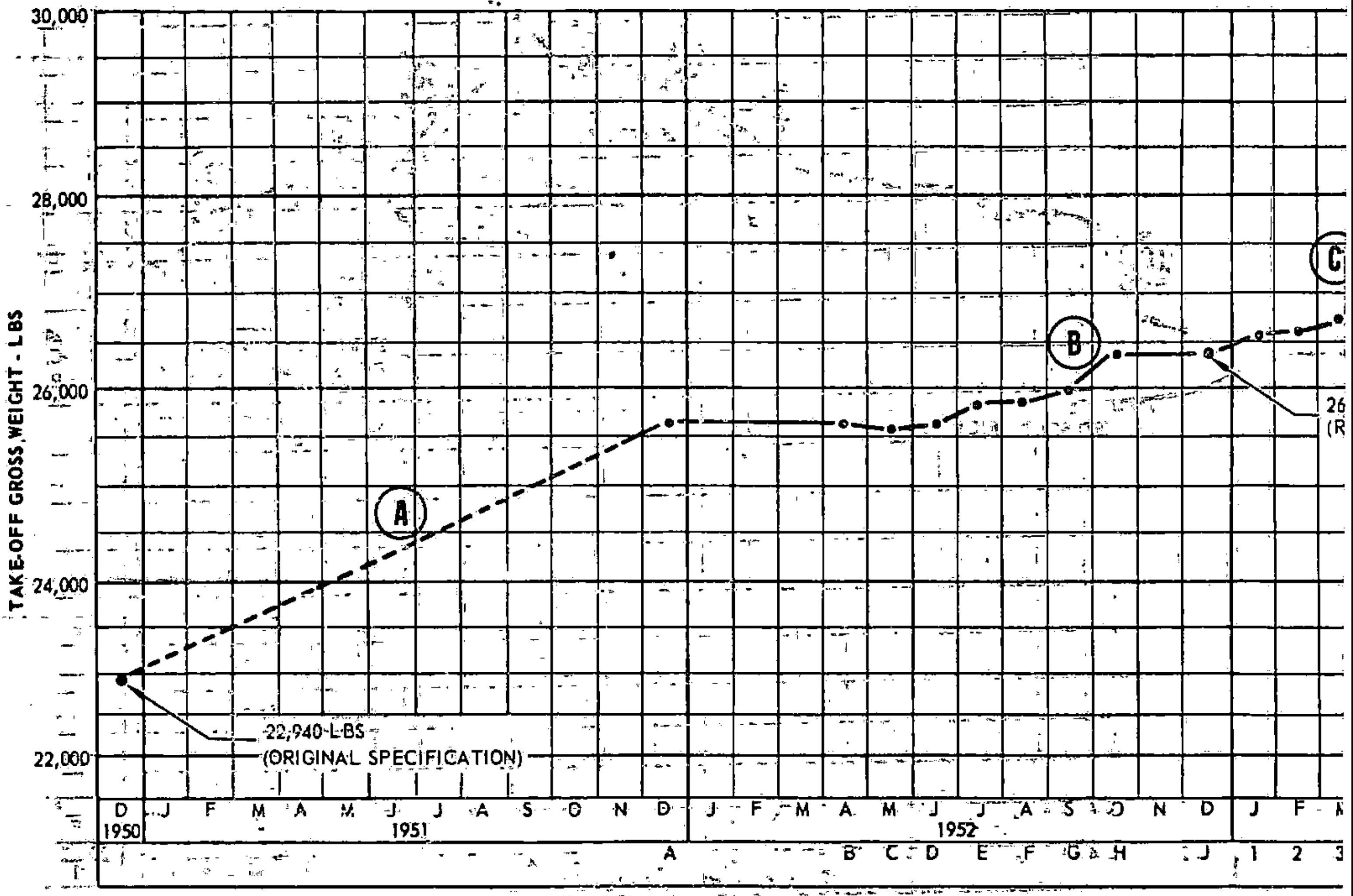
BODY CONFIGURATION CHANGE	964
CAMBERED LEADING EDGE	-151
NO WING & TAIL ANTI-ICING	-102
TITANIUM ENGINE	-250
MISC. INCL. WEIGHT SAVING ITEMS	-37
TOTAL	+726

E

FURTHER CONFIGURATION CHA
INSTALL WING & TAIL ANTI-ICI
REVISE MISSILE DISPLACING GE
MISC. WEIGHT SAVING ITEMS
TOT

F

CONVERT TO J-57-JT3-N ENGIN
MG-3 CHANGES & IMPROVEMENT
REVISE ENGINE INTAKE DUCTS
EXTEND OUTBOARD WING FEN
& ADD INBOARD FENCE
MISC. WEIGHT SAVING ITEMS -
TOTAL



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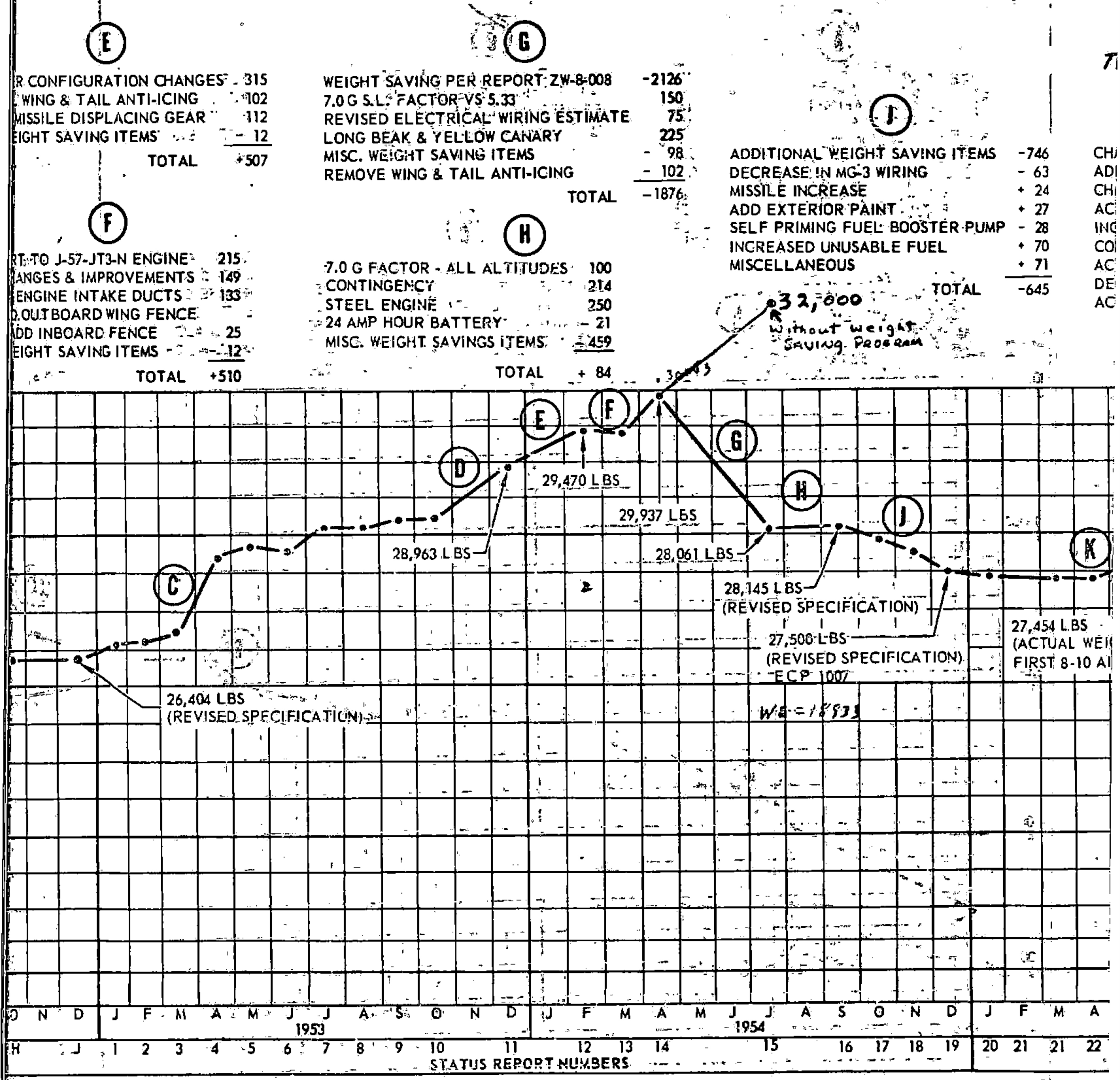
MODEL F 102A WEIGHT HISTORY



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R CONFIGURATION CHANGES	315
WING & TAIL ANTI-ICING	102
MISSILE DISPLACING GEAR	112
EIGHT SAVING ITEMS	- 12
TOTAL	+507

Ⓕ

RT TO J-57-JT3-N ENGINE	215
ANGES & IMPROVEMENTS	149
ENGINE INTAKE DUCTS	133
D.OUTBOARD WING FENCE	-
ADD INBOARD FENCE	25
EIGHT SAVING ITEMS	- 12
TOTAL	+510

Ⓖ

WEIGHT SAVING PER REPORT ZW-8-008	-2126
7.0 G S.L. FACTOR VS 5.33	150
REVISED ELECTRICAL WIRING ESTIMATE	75
LONG BEAK & YELLOW CANARY	225
MISC. WEIGHT SAVING ITEMS	- 98
REMOVE WING & TAIL ANTI-ICING	- 102
TOTAL	-1876

Ⓗ

7.0 G FACTOR - ALL ALTITUDES	100
CONTINGENCY	214
STEEL ENGINE	250
24 AMP HOUR BATTERY	- 21
MISC. WEIGHT SAVINGS ITEMS	-459
TOTAL	+ 84

Ⓙ

ADDITIONAL WEIGHT SAVING ITEMS	-746
DECREASE IN MG-3 WIRING	- 63
MISSILE INCREASE	+ 24
ADD EXTERIOR PAINT	+ 27
SELF PRIMING FUEL BOOSTER PUMP	- 28
INCREASED UNUSABLE FUEL	+ 70
MISCELLANEOUS	+ 71
TOTAL	-645

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28,963 LBS
29,470 LBS
29,937 LBS
28,061 LBS
28,145 LBS (REVISED SPECIFICATION)
27,500 LBS (REVISED SPECIFICATION) ECP 1007
27,454 LBS (ACTUAL WEI FIRST 8-10 AI
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1954
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STATUS REPORT NUMBERS

FIRST FLIGHT DATES

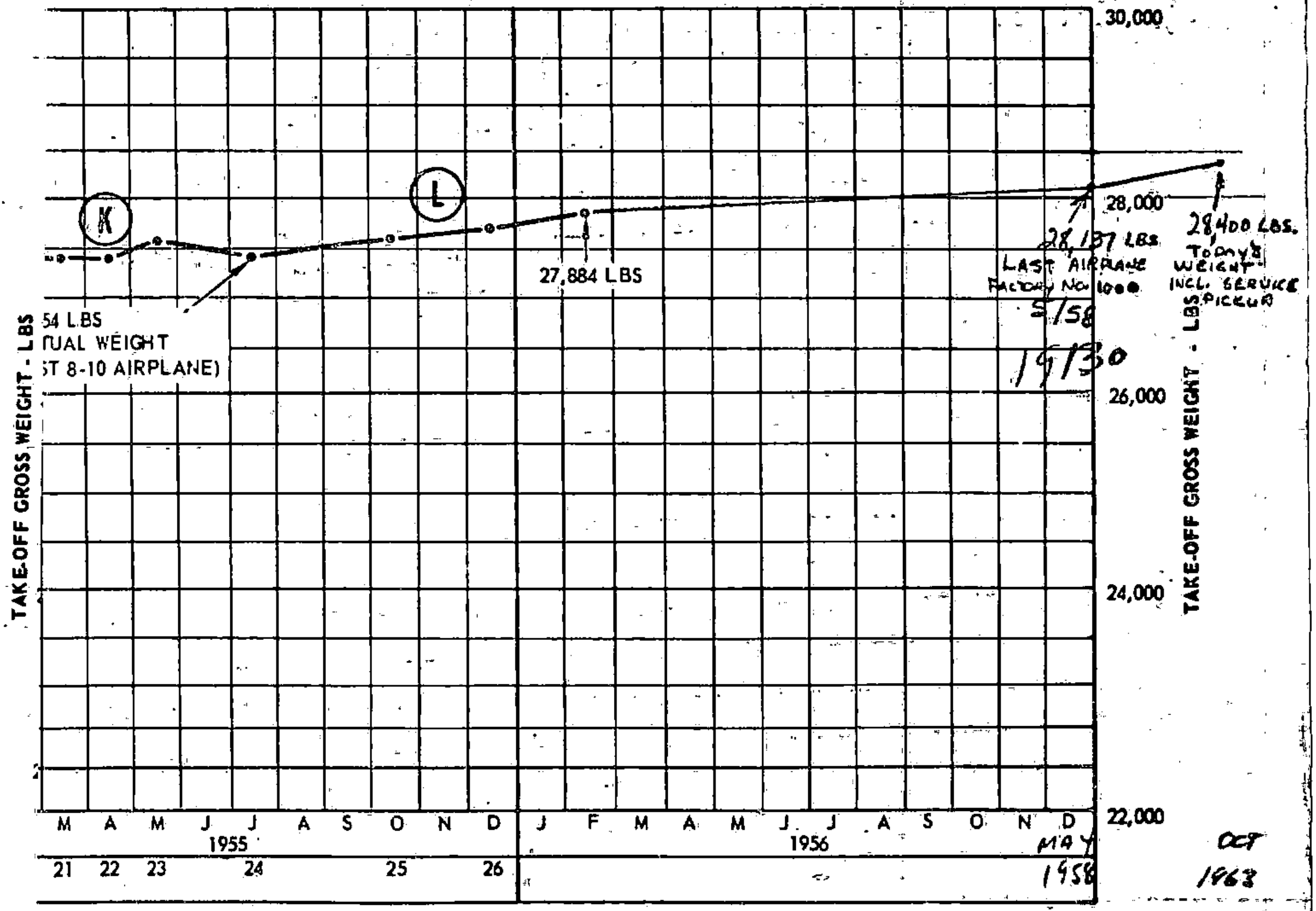
F102	8-80	24 OCT. '53
"	8-82	18 MAY '54
"	8-90	20 DEC. '54
"	8-10	24 JUNE '55
TF-102	8-12	31 OCT. '55

Ⓚ

CHANGE TO COMBUSTION STARTER	+ 75
ADD EXTERNAL TANK PROVISIONS	+ 84
CHANGE TO COMPUTING SIGHT	+ 48
ACTUAL VS. CALCULATED WEIGHTS	-246
INCREASED UNUSABLE FUEL	+ 24
CONTINGENCY ELIMINATED	- 197
ACTUAL WEIGHT OF CVAC MG-10 WIRE	+ 100
DESIGN REFINEMENTS & MISC.	+ 120
ACTUAL AIRPLANE UNDERWEIGHT	- 54
TOTAL	- 46

Ⓛ

INCREASED AREA TAIL (95.14 SQ. FT.)	+ 153
CHANGE TO 2 INCH ROCKETS	+ 29
LARGER NOZZLE ACTUATORS ON ENGINE	+ 50
ACTUAL WEIGHT OF J-57-P-23 ENGINES	- 100
ADDED FOURTH AIR BOTTLE	+ 25
REINFORCE NOSE SECTION	+ 25
EXTEND LEADING EDGE - INTAKE DUCT	+ 125
ADD TWO FUEL BOOSTER PUMPS	+ 57
DESIGN REFINEMENTS & MISC.	+ 113
ACTUAL AIRPLANE UNDERWEIGHT	- 47
TOTAL	+ 430



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CONVAIR MODEL 8

TED STATES AIR FORCE MODEL F-102A

INTERCEPTOR FIGHTER AIRPLANE

ONTRACTS AF33(600)-5942 and -23903

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REPORT NO. ZD-8-003

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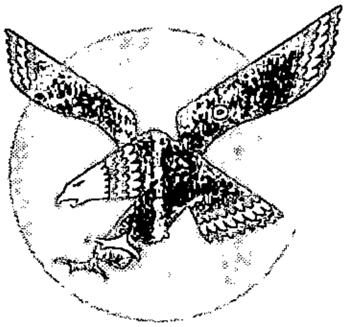

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CONVAIR

A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO

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CONVAIR SAN DIEGO

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MODEL SPECIFICATION
FOR
CONVAIR MODEL 8
UNITED STATES AIR FORCE MODEL F-102A
INTERCEPTOR FIGHTER AIRPLANE

CONTRACTS AF33(600)-5942 and -23903

* * * *

REPORT NO. ZD-8-003

DATED 3 SEPTEMBER 1954

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SUPERSEDES ZD-8-001

REVISED 1 DECEMBER 1952

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Reclassified by: Dept. Date
130-1 4-4-67

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By C. G. Priest
Specification Section

Approved M. M. Fox
Project Engineer

Checked W. F. Brown
Specification Section

Approved
Chief Engineer

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UNCLASSIFIED

TABLE OF CONTENTS

1. SCOPE AND CLASSIFICATION 1

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS . 2

3. REQUIREMENTS 3

3.1 CHARACTERISTICS 3
3.1.1 THREE VIEW DRAWING 3
3.1.2 PERFORMANCE 3
3.1.3 WEIGHTS 7
3.1.4 CENTER OF GRAVITY LOCATIONS 12
3.1.5 AREAS 14
3.1.6 DIMENSIONS AND GENERAL DATA 14
3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS 16

3.2 GENERAL 17
3.2.1 GENERAL INTERIOR ARRANGEMENT 17
3.2.2 MATERIALS 18
3.2.3 WORKMANSHIP 18
3.2.4 PRODUCTION, MAINTENANCE AND REPAIR 18
3.2.5 INTERCHANGEABILITY AND REPLACEABILITY 18
3.2.6 FINISH 18
3.2.7 IDENTIFICATION AND MARKING 18
3.2.8 EXTREME TEMPERATURE OPERATION 18
3.2.9 CLIMATIC REQUIREMENTS 19
3.2.10 LUBRICATION 19
3.2.11 STANDARD PARTS 19
3.2.12 CREW 19
3.2.13 EQUIPMENT INSTALLATION 19
3.2.13.1 ARMAMENT 19
3.2.13.2 COMMUNICATION AND NAVIGATION EQUIPMENT 20
3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION 20

3.3 AERODYNAMICS 21
3.3.1 GENERAL 21
3.3.2 STABILITY AND CONTROL 21

CONFIDENTIAL

TABLE OF CONTENTS

3.3.2.1 STABILITY AND CONTROLLABILITY 21
3.3.2.2 PERMISSIBLE AERODYNAMICS CENTER OF GRAVITY LIMITS 21
3.3.2.3 SPEED BRAKE OPENING 21
3.3.2.4 LONGITUDINAL DECELERATION 21

3.4 STRUCTURAL DESIGN CRITERIA 22
3.4.1 LIMIT FLIGHT LOAD FACTORS 22
3.4.2 LIMIT GROUND LOAD FACTORS 22
3.4.3 LIMIT DIVING SPEED 22

3.5 WING GROUP 25
3.5.1 DESCRIPTION AND COMPONENTS 25
3.5.2 CONSTRUCTION 25
3.5.3 ELEVONS 25
3.5.4 LIFT AND DRAG INCREASING DEVICES 25

3.6 TAIL GROUP 26
3.6.1 DESCRIPTION AND COMPONENTS 26
3.6.2 STABILIZER 26
3.6.3 ELEVATOR 26
3.6.4 FIN 26
3.6.4.1 BRAKE PARACHUTE 26
3.6.5 RUDDER 26

3.7 BODY GROUP 27
3.7.1 FUSELAGE 27
3.7.1.1 DESCRIPTION 27
3.7.1.2 CONSTRUCTION 27
3.7.1.3 CREW AND PERSONNEL STATIONS 27
3.7.1.4 CARGO COMPARTMENTS 28
3.7.1.5 EQUIPMENT COMPARTMENTS 28
3.7.1.6 SPEED BRAKES 28
3.7.1.7 ROCKET AND MISSILE BAYS 28
3.7.1.8 WHEEL WELLS 28
3.7.1.9 ACCESSORY COMPARTMENT 29
3.7.2 HULL 29

CONFIDENTIAL

TABLE OF CONTENTS

3.10.5.2 MANUAL 36
3.10.5.3 PILOT ASSIST 36
3.10.5.4 AUTOMATIC FIRE CONTROL 36

3.11 ENGINE SECTION 37
3.11.1 DESCRIPTION AND COMPONENTS 37
3.11.2 CONSTRUCTION 37
3.11.3 ENGINE MOUNTS 37
3.11.4 VIBRATION ISOLATORS 37
3.11.5 FIREWALLS 37
3.11.6 COWLING AND COWL FLAPS 37
3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE 37
3.11.8 FIRE ACCESS DOORS 37

3.12 PROPULSION 38
3.12.1 GENERAL DESCRIPTION AND COMPONENTS 38
3.12.2 MAIN PROPULSION UNIT 38
3.12.3 AUXILIARY PROPULSION UNIT 38
3.12.4 ENGINE-DRIVEN ACCESSORIES 38
3.12.5 AIR INDUCTION SYSTEM 38
3.12.6 EXHAUST SYSTEM 38
3.12.7 COOLING SYSTEM 38
3.12.8 LUBRICATING SYSTEM 39
3.12.8.1 DESCRIPTION AND COMPONENTS 39
3.12.9 FUEL SYSTEM 39
3.12.9.1 DESCRIPTION AND COMPONENTS 39
3.12.9.2 PUMPS 39
3.12.9.3 TANKS (Fixed) 39
3.12.9.4 TANKS (Jettisonable) 39
3.12.9.5 VENT SYSTEM 40
3.12.9.6 PIPING AND FITTINGS 40
3.12.9.7 VALVES 40
3.12.9.8 STRAINERS AND FILTERS 40
3.12.9.9 QUANTITY GAGES AND FLOWMETERS 40
3.12.9.10 DRAINAGE PROVISIONS 41
3.12.9.11 FUEL EVAPORATION AND TRANSFER CONTROL 41
3.12.9.12 REFUELING PROVISIONS 41

TABLE OF CONTENTS

3.12.9.13 DEFUELING PROVISIONS 41
3.12.10 WATER INJECTION SYSTEM 41
3.12.11 PROPULSION SYSTEM CONTROLS 41
3.12.12 STARTING SYSTEM 41
3.12.13 PROPELLER 41
3.12.14 ROCKET PROPULSION SYSTEM 41

3.13 AUXILIARY POWER PLANT 42

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT 43
3.14.1 INSTRUMENTS 43
3.14.2 NAVIGATION EQUIPMENT 43
3.14.3 INSTALLATION 43

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS 44
3.15.1 HYDRAULIC SYSTEM 44
3.15.1.1 DESCRIPTION AND COMPONENTS 44
3.15.1.2 SUMMARY OF ACTUATED ITEMS 45
3.15.2 PNEUMATIC SYSTEMS 45
3.15.2.1 LOW PRESSURE PNEUMATIC SYSTEM 45
3.15.2.2 HIGH PRESSURE PNEUMATIC SYSTEM 45

3.16 ELECTRICAL 47
3.16.1 DESCRIPTION 47
3.16.2 ELECTRICAL POWER SUPPLY 47
3.16.2.1 DIRECT CURRENT 47
3.16.2.2 ALTERNATING CURRENT 48
3.16.3 ELECTRICAL POWER CONVERSION 48
3.16.3.1 INSTRUMENT POWER 48
3.16.3.2 EMERGENCY POWER 48
3.16.4 EQUIPMENT INSTALLATION 49
3.16.5 WIRING 49
3.16.6 BONDING 49
3.16.7 CONTROLS 49
3.16.7.1 POWER CONTROL 49
3.16.8 LIGHTING 50
3.16.8.1 GENERAL 50
3.16.8.2 INTERIOR 50

TABLE OF CONTENTS

3.16.8.3 EXTERIOR 50
3.16.9 IGNITION AND STARTING CONTROL SYSTEM 50
3.16.10 RECEPTACLES 50
3.16.10.1 EXTERNAL POWER 50
3.16.10.2 ELECTRICAL CONNECTORS 51
3.16.10.3 FUEL NOZZLE GROUNDING JACK 51
3.16.10.4 STATIC GROUND 51
3.16.11 INDICATORS 51
3.16.11.1 ALARMS 51
3.16.11.2 SIGNAL ASSEMBLIES 51
3.16.11.3 WARNING LIGHTS 51
3.16.11.4 METERS 52
3.16.12 ELECTRIC DRIVES 52
3.16.13 RELAYS 52
3.16.14 BOOSTER COIL 52
3.16.15 FILTERS 52
3.16.16 LOAD ANALYSIS 52

3.17 ELECTRONICS 53
3.17.1 EQUIPMENT 53
3.17.1.1 CONTROL PANEL 54
3.17.1.2 ANTENNAS 54
3.17.1.3 INTERFERENCE 55
3.17.1.4 WIRING 55
3.17.1.5 COOLING 55
3.17.2 COMMUNICATIONS EQUIPMENT 55
3.17.2.1 COMMAND SET AN/ARC-34 55
3.17.2.2 LIAISON SET 55
3.17.2.3 INTERPHONE 55
3.17.2.4 MICROPHONE AND HEADSETS 56
3.17.2.5 FILTER EQUIPMENT 56
3.17.2.6 RECORDING EQUIPMENT 56
3.17.3 NAVIGATION EQUIPMENT 56
3.17.3.1 RADIO COMPASS 56
3.17.3.2 MARKER BEACON EQUIPMENT 56
3.17.3.3 INSTRUMENT APPROACH EQUIPMENT 56
3.17.3.4 ALTIMETER - RADIO 57

TABLE OF CONTENTS

3.17.3.5 RADIO RANGE RECEIVER 57
3.17.3.6 HOMING ADAPTER AN/ARA-25 57
3.17.3.7 VHF NAVIGATION RECEIVER AN/ARN-14 57
3.17.3.8 DISTANCE MEASURING EQUIPMENT AN/ARN-21 57
3.17.3.9 ARBITRARY COURSE COMPUTER 57
3.17.4 RADAR 57
3.17.4.1 SEARCH EQUIPMENT 57
3.17.4.2 LORAN EQUIPMENT 58
3.17.4.3 AUTOMATIC GROUND POSITION INDICATING EQUIPMENT 58
3.17.4.4 IDENTIFICATION EQUIPMENT 58
3.17.4.5 INTERROGATION EQUIPMENT 59
3.17.4.6 RADAR BEACON 59
3.17.4.7 FIRE CONTROL SYSTEM 59
3.17.5 ELECTRONIC COUNTERMEASURE 60
3.17.6 ELECTRONIC GUIDANCE SYSTEM 60
3.17.6.1 GUIDE LINKS AND SYSTEMS 60
3.17.6.2 ANTENNA - DATA LINK 60
3.17.7 STATIC DISCHARGERS 60
3.17.8 EMERGENCY RESCUE TRANSMITTER 60
3.17.9 RADOME 60
3.17.10 GROUND TEST EQUIPMENT OUTLETS 61

3.18 ARMAMENT 62
3.18.1 DESCRIPTION 62
3.18.2 FIXED GUNS 62
3.18.3 ROCKETS AND MISSILES 62
3.18.3.1 DESCRIPTION 62
3.18.3.2 ROCKET LAUNCHER 62
3.18.3.3 MISSILE LAUNCHER 62
3.18.3.4 ALIGNMENT 63
3.18.3.5 ARMAMENT CONTROLS 63
3.18.3.6 EXTENSION AND RETRACTION TIME 63
3.18.4 FLEXIBLE GUNS 63
3.18.5 STORES 64
3.18.6 PASSIVE DEFENSE 64
3.18.7 BORE SIGHTING 64

CONFIDENTIAL

TABLE OF CONTENTS

3.19 FURNISHINGS AND EQUIPMENT 65
3.19.1 ACCOMMODATIONS FOR PERSONNEL 65
3.19.2 MISCELLANEOUS EQUIPMENT 65
3.19.3 FURNISHINGS 66
3.19.4 EMERGENCY EQUIPMENT 66
3.19.5 OXYGEN EQUIPMENT 66
3.19.6 EMERGENCY RESCUE EQUIPMENT 66
3.19.7 SPARE BULBS 66

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT 67
3.20.1 AIR CONDITIONING 67
3.20.1.1 IN-FLIGHT AIR CONDITIONING 67
3.20.1.2 GROUND AIR CONDITIONING 68
3.20.2 ANTI-ICING 69
3.20.2.1 ANTI-ICING OF NONTRANSPARENT AREAS 69
3.20.2.2 ANTI-ICING, DEFROSTING AND DEFOGGING OF TRANSPARENT AREAS 69

3.21 PHOTOGRAPHIC 69

3.22 AUXILIARY GEAR 71
3.22.1 TOWING PROVISIONS 71
3.22.1.1 MAIN LANDING GEAR 71
3.22.1.2 NOSE LANDING GEAR 71
3.22.2 JACKING PROVISIONS 71
3.22.3 MOORING PROVISIONS 71
3.22.4 HOISTING PROVISIONS 71
3.22.5 LEVELING 71
3.22.6 COVERS AND SHIELDS 72
3.22.7 SPECIAL GROUND SUPPORT EQUIPMENT 72

4. SAMPLING, INSPECTION AND TEST PROCEDURES 73

5. PREPARATION FOR DELIVERY 73

6. NOTES 74

CONFIDENTIAL

TABLE OF CONTENTS

6.1 EXPLANATORY INFORMATION 74

6.2 ADDITIONAL INFORMATION 74

6.3 DEFINITIONS 74
6.3.1 COMPLETE PROVISION FOR 74
6.3.2 STRUCTURAL PROVISIONS FOR 74
6.3.3 SPACE PROVISIONS FOR 74
6.3.4 SPACE AND WEIGHT PROVISIONS 74
6.3.5 OTHER DEFINITIONS 74

APPENDIX I-A GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT CONTRACTOR INSTALLED 75

APPENDIX I-B GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT GOVERNMENT INSTALLED 83

APPENDIX I-C CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT CONTRACTOR INSTALLED 85

APPENDIX I-D SPECIAL EQUIPMENT - CONTRACTOR FURNISHED 90

APPENDIX II DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS 91

APPENDIX III-A INTERCHANGEABILITY LIST 289

APPENDIX III-B REPLACEABILITY LIST 291

CONFIDENTIAL

LIST OF ECP's INCLUDED IN THIS SPECIFICATION

ECP	TITLE
1	Change from Low Pressure Oxygen System to High Pressure Oxygen System and Increase Capacity
2	Automatic-Opening, Cartridge-Operated Lap Belt
3	GFAE Changes - Landing Gear
4	GFAE Changes - Pneumatics
5	Type J-1 Ammeter (Aerno 61-700) and Type C-2 Voltmeter (Aerno 61-9750) - Change from GFAE to CFE
6	Change Fuel Flow Transmitter and Indicator from CFE to GFAE
8	Provisions from De-Slaving of the Compass Gyro
9	Move Rudder Pedals Downward and Forward and Relocate Sequence Control Panel
12	Anti-Corrosion Capsules - Deletion of
13	Anti-G Suit Regulating Valve
14	Combination Flight Report Holder, Map and Data Case
15	Securing of Plastic Panels
16	Indicator; Air Speed, Mach Number-Change Types
17	Altimeter; Cabin Pressure-Change Type
21	Finish Specification - Change
22	Emergency Alternator - Change from Single Ø to three Ø - Delete Inverter

LIST OF ECP's INCLUDED IN THIS SPECIFICATION
(Cont)

ECP	TITLE
24	Delete GTC - Change Engine Starter
25	Delete Ice Warning Indicator-Add Identification to Turn and Slip and Rate of Climb Indicators
26	Canopy Remover, Personnel Ejection - Change of
28	Redesign of Windshield and Canopy
29	Leading Edge and Wing Tip - Change of
30	Electrical Heating Air Conditioning Water Supply
32	Lighting Mock-Up Changes
33	Generator Control Panels - AC and DC - Change to GFAE
34	Antenna Hand Control - Relocate
35	Armament Control Panel - Revise
37	Engine Ice Detection System
38	Clock - Type A-13A
40	Engine Ignition
43	Oxygen System Simplification
44	Delete Switch SA-3A/A (Radar Set AN/APX-6)
45	Ideal Fuselage Configuration
47	Fuel Strainer

LIST OF ECP's INCLUDED IN THIS SPECIFICATION
(Cont)

ECP	TITLE
49	Windshield Cleaners - Deletion of Until Installation of New Canopy
50	Incorporation of A F Comments and Miscellaneous Specification Corrections
51	GTC Connection and Starter Air Ducts - Redesign of
55	GFAE and CFE Requirements - Change
56	B-7A Amplifier - Addition of
63	Deletion of Residual Heat Doors
70	Fire Control Systems - Radio, Navigation and Communications Equipment - Requirements for
72	Pilot's Assist - Installation of
108	Mechanical Valve After-burner Fuel Control Linkage - Addition of
130	Control Stick Grip Trim Switch - Change
131	Engine Pump Low Pressure Warning Switch - Relocation of

1. SCOPE AND CLASSIFICATION:

1.1 This specification covers the following airplane:

Service Model Designation	F-102A
Consolidated Vultee Aircraft Corporation Model	8
Number and Places for Crew	One Pilot
Number and Kind of Engine	One Turbo-jet

1.1.1 The primary mission of this airplane is the interception and destruction of attacking enemy aircraft and airborne missiles which fall within the performance capabilities of the aircraft, its armament and the associated electronics equipment under all conditions of weather and visibility and to fulfill the requirements for general, local, and free lance defense operations for aircraft of this type.

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS:

2.1 Applicable specifications listed in the Index of Specifications and Bulletins Approved for Air Force Procurement, dated 1 July 1950, including Supplements through 1 September 1950, shall form a part of this specification.

2.2 ⑧⑨ The applicable requirements of the following publications with dates as listed below form a part of this specification:

Air Force Specification No. R-1800-E, dated 18 May 1944 and Amendment No. 5 dated 28 May 1945.

Handbook of Instructions for Aircraft Designers Ninth Edition, including revision up to and including 1 April 1950.

Request for Proposal AMC Letter MCREOA-4/WRR/bmm, dated 1 September 1950.

Pratt and Whitney Engine Specification No. A-1686 dated 1 February 1954.

2.3 All other applicable specifications and drawings referenced herein, (but not by revision letter, date or amendment), shall be of the issue in effect on 1 September 1950.

3. REQUIREMENTS:

3.1 CHARACTERISTICS:

3.1.1 THREE VIEW DRAWING: (See Page 4).

3.1.2 PERFORMANCE: For estimated performance see Paragraph 3.1.2.1 (page 5) and Performance Summary (page 6).

3.1.1

Revised by 1010R$_1$ dtd.
7-21-55

Effective on A/C Ser. No.
AF53-1791 thru 53-1811.

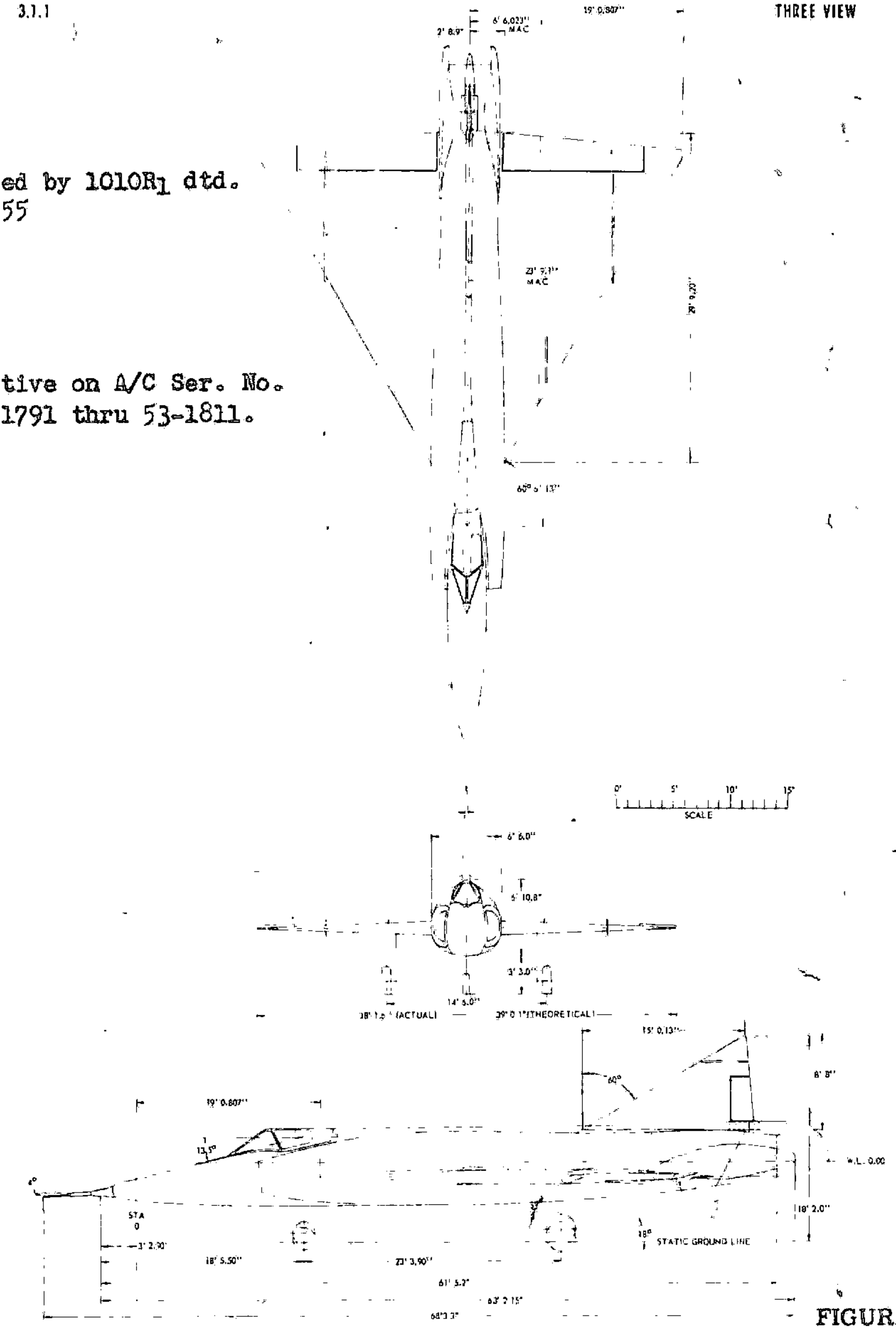

FIGURE 1

3.1.2.1 ESTIMATED-TABULATED PERFORMANCE

		Pratt and Whitney J57-P-23
Rated Static Thrust at Sea Level	Lb	16,000
Take-Off Weight (full load)	Lb	28,145
Combat Weight*	Lb	25,485
Landing Weight**	Lb	22,075
Fuel (1050 Gal.)	Lb	6,825
High Speed with Military plus Afterburner Power		
35,000 feet	Mach No.	1.18
50,000 feet	Mach No.	0.97
Combat Ceiling with Military plus Afterburner Power (500 ft/min rate of climb)	Ft	52,000
Time to Climb to Altitude with Military plus Afterburner Power (from start of take-off run)		
40,000 feet	Min	4.4
50,000 feet	Min	7.5
Take-Off Without Auxiliary Devices Over 50-Foot Obstacle with Military plus Afterburner Power Take-Off Weight	Ft	3,040
Land Over 50-Foot Obstacles (Landing Weight)		
Without Auxiliary Landing Devices	Ft	4,360
With 14-foot Diameter Drogue Chute	Ft	3,660
Interceptor Mission Performance		
Combat Radius - Area Intercept Mission per MIL-C-5011A (combat 5 min at max power)	Nau Mi	365
Loiter Time - Point Intercept Mission per MIL-C-5011A (combat 5 min at max power)	Hr	1.45

* Weight at start of combat for Point Intercept Mission.

** Landing Weight corresponding to Point Intercept Mission. Includes full armament and 20 min reserve fuel at sea level (at V for max endurance).

NOTE: The above performance is without external fuel tanks installed.

FIGURE 2

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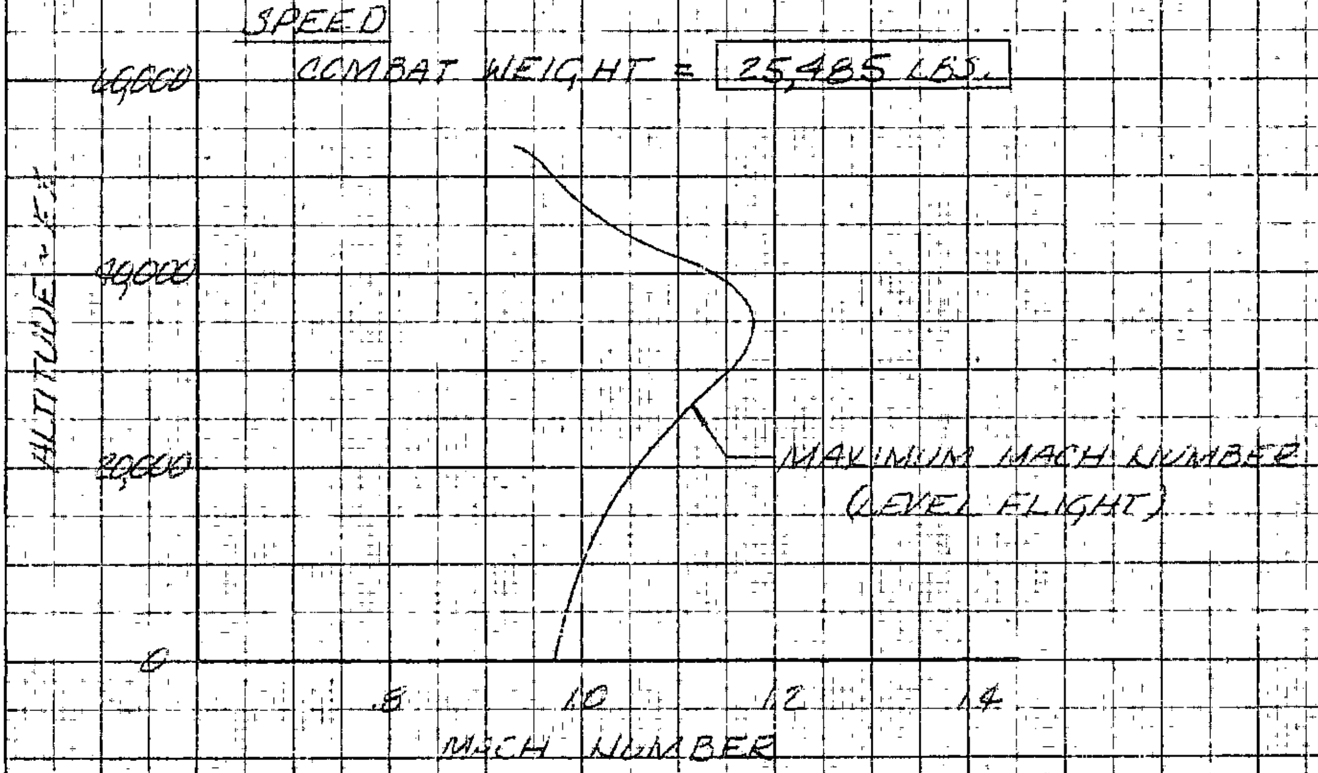
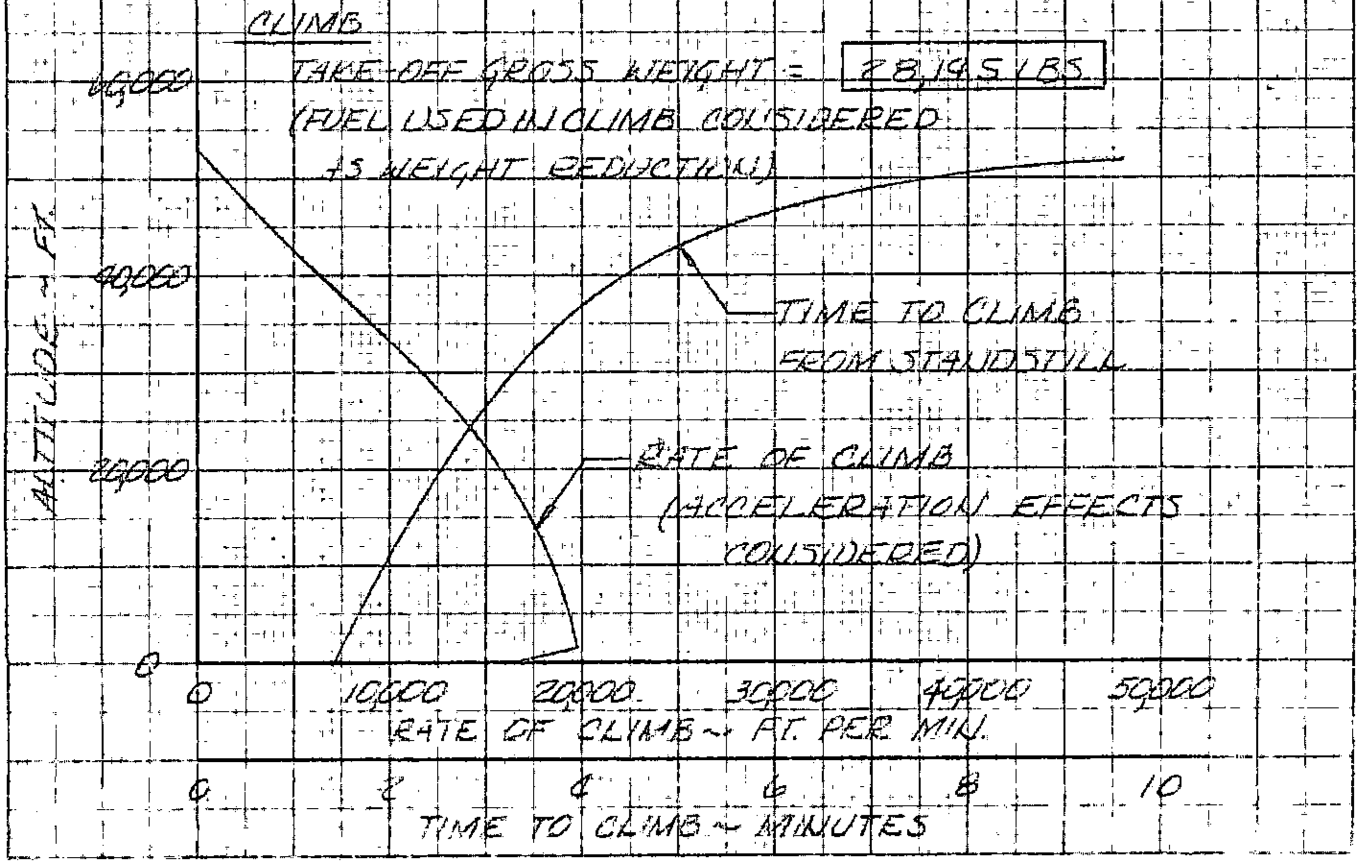
F-102A AIRPLANE

PERFORMANCE SUMMARY





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3.1.3 WEIGHTS: For estimated weights see Group Weight Statement - AN9103-D on Pages 8 thru 11. For weight and balance purposes the aircraft is designated as Class 1B as defined in Specification AN-W-11b.

CONFIDENTIAL

AN-9103-D

NAME CONFIDENTIAL

DATE

GROUP WEIGHT STATEMENT
WEIGHT EMPTY

PAGE 8

MODEL F-102A

REPORT ZD-8-003

1	WING GROUP		3,197
2	CENTER SECTION - BASIC STRUCTURE	2,731	
3	INTERMEDIATE PANEL - BASIC STRUCTURE		
4	OUTER PANEL - BASIC STRUCTURE (INCL. TIPS LBS.)		
5	Elevons	385	
6	SECONDARY STRUCTURE ~~(INCL. WINGFOLD MECHANISM~~ LBS.)	81	
7	AILERONS (INCL. BALANCE WEIGHT LBS.)		
8	FLAPS - TRAILING EDGE		
9	- LEADING EDGE		
10	SLATS		
11	SPOILERS		
12	SPEED BRAKES		
13			
14			
15	TAIL GROUP		377
16	STABILIZER - BASIC STRUCTURE		
17	FINS - BASIC STRUCTURE ~~(INCL. DORSAL~~ LBS.)	332	
18	SECONDARY STRUCTURE (STAB. & FINS)	10	
19	ELEVATOR (INCL. BALANCE WEIGHT LBS.)		
20	RUDDERS (INCL. BALANCE WEIGHT LBS.)	35	
21			
22			
23	BODY GROUP		3,997
24	FUSELAGE OR HULL - BASIC STRUCTURE	2,668	
25	BOOMS - BASIC STRUCTURE		
26	SECONDARY STRUCTURE - FUSELAGE OR HULL	459	
27	- BOOMS		
28	- SPEEDBRAKES	63	
29	- DOORS, PANELS & MISC.	807	
30			
31	ALIGHTING GEAR GROUP - LAND (TYPE:)		1,048

	LOCATION	WHEELS, BRAKES TIRES, TUBES, AIR	STRUCTURE	CONTROLS		
32–33						
34	Main	363	385	111	859	
35	Nose	44	105	40	189	
36						
37						
38						
39						

40	ALIGHTING GEAR GROUP - WATER		

	LOCATION	FLOATS	STRUTS	CONTROLS		
41						
42						
43						
44						
45						

46	SURFACE CONTROLS GROUP		432
47	COCKPIT CONTROLS	112	
48	AUTOMATIC PILOT		
49	SYSTEM CONTROLS (INCL. POWER & FEEL CONTROLS LBS.)	320	
50			
51	ENGINE SECTION OR NACELLE GROUP		38
52	INBOARD		
53	CENTER		
54	OUTBOARD		
55	DOORS, PANELS & MISC.		
56			
57	TOTAL (TO BE BROUGHT FORWARD)		9,089

CONFIDENTIAL

AN-9103-D
NAME
DATE

CONFIDENTIAL

GROUP WEIGHT STATEMENT
WEIGHT EMPTY

PAGE 9
MODEL F-102A
REPORT ZD-8-003

1	PROPULSION GROUP					6,204
2			AUXILIARY		MAIN	
3	ENGINE INSTALLATION J57-P23				5,058	
4	AFTERBURNERS (IF FURN. SEPARATELY)					
5	ACCESSORY GEAR BOXES & DRIVES					
6	SUPERCHARGERS (FOR TURBO TYPES)					
7	AIR INDUCTION SYSTEM				673	
8	EXHAUST SYSTEM				117	
9	COOLING SYSTEM				14	
10	LUBRICATING SYSTEM		29		4	
11	TANKS					
12	COOLING INSTALLATION					
13	DUCTS, PLUMBING, ETC.					
14	FUEL SYSTEM				303	
15	TANKS - PROTECTED					
16	- UNPROTECTED					
17	PLUMBING, ETC.					
18	WATER INJECTION SYSTEM					
19	ENGINE CONTROLS				24	
20	STARTING SYSTEM				42	
21	PROPELLER INSTALLATION					
22						
23						
24	AUXILIARY POWER PLANT GROUP					129
25	INSTRUMENTS & NAVIGATIONAL EQUIPMENT GROUP					275
26	HYDRAULIC & PNEUMATIC GROUP					
27						
28						
29	ELECTRICAL GROUP -AC					376
30	Electrical Group -DC					185
31						
32	ELECTRONICS GROUP					2,135
33	EQUIPMENT				2,001	
34	INSTALLATION				134	
35						
36	ARMAMENT GROUP (INCL. GUNFIRE PROTECTION 0 LBS.)					613
37	FURNISHINGS & EQUIPMENT GROUP					195
38	ACCOMMODATIONS FOR PERSONNEL				146	
39	MISCELLANEOUS EQUIPMENT				38	
40	FURNISHINGS					
41	EMERGENCY EQUIPMENT				11	
42						
43	AIR CONDITIONING & ANTI-ICING EQUIPMENT GROUP					210
44	AIR CONDITIONING				161	
45	ANTI-ICING				49	
46						
47	PHOTOGRAPHIC GROUP					
48	AUXILIARY GEAR GROUP					70
49	HANDLING GEAR				13	
50	ARRESTING GEAR				57	
51	CATAPULTING GEAR					
52	ATO GEAR					
53						
54						
55	MANUFACTURING VARIATION					
56	TOTAL FROM PG. 2					9,089
57	WEIGHT EMPTY					19,541

CONFIDENTIAL

AN-9103-D
NAME
DATE

CONFIDENTIAL

GROUP WEIGHT STATEMENT
USEFUL LOAD & GROSS WEIGHT

PAGE 10
MODEL F-102A
REPORT ZD-8-003

1	LOAD CONDITION				Design		Alternate Rockets	Alternate Ferry
2								
3	CREW (NO. 1) Incl. Parachute				230		230	230
4	PASSENGERS (NO.)							
5	FUEL	Type	Gals.					
6	UNUSABLE	JP-4	11.4		74		74	74
7	INTERNAL	JP-4	1,050		6,825		6,825	6,825
8								
9								
10	EXTERNAL	JP-4	460					2,990
11	External Tank Provisions							76
12	BOMB BAY							
13	External Tank and Pylon - Droppable							266
14	OIL							
15	TRAPPED				25		25	25
16	ENGINE				25		25	25
17								
18	FUEL TANKS (LOCATION)							
19	WATER INJECTION FLUID (GALS)							
20								
21	BAGGAGE							
22	CARGO							
23								
24	ARMAMENT							
25	GUNS (Location)	Fix. or Flex.	Qty.	Cal.				
26								
27								
28								
29								
30								
31								
32	AMMUNITION							
33								
34								
35								
36								
37								
38								
39	INSTALLATIONS (BOMB, TORPEDO, ROCKET, ETC.)							
*40	BOMB OR TORPEDO RACKS							
41	Missiles (6)				801			801
42	Missile Launchers (6) and Installation				174			174
43	Rockets (24) in Doors				432		432	432
44	Rockets (72) in pods						1,296	
45	Rocket Pods (6)						280	
46	EQUIPMENT							
47	PYROTECHNICS							
48	PHOTOGRAPHIC							
49								
*50	OXYGEN							
51								
52	MISCELLANEOUS				18		65	18
53								
54								
55	USEFUL LOAD				8,604		9,252	11,936
56	WEIGHT EMPTY				19,541		19,541	19,541
57	GROSS WEIGHT				28,145		28,793	31,477

*If not specified as weight empty.

CONFIDENTIAL

A -9103-D
NAME
DATE

CONFIDENTIAL

GROUP WEIGHT STATEMENT
DIMENSIONAL & STRUCTURAL DATA

PAGE 11
MODEL F-102A
REPORT ZD-8-008

1 LENGTH - OVERALL (FT.)			HEIGHT - OVERALL - STATIC (FT.)				
2	Main Floats	Aux. Floats	Booms	Fuse or Hull	Nacelles Inboard	Nacelles Center	Nacelles Outboard
3 LENGTH - MAX. (FT.) (Not Incl. Airspeed Boom)				63.18			
4 DEPTH - MAX. (FT.)				6.90			
5 WIDTH - MAX. (FT.)				6.50			
6 WETTED AREA (SQ. FT.)							
*7 FLOAT OR HULL DISPL. - MAX (LBS.)							

8 FUSELAGE VOLUME (CU. FT.)	PRESSURIZED	TOTAL

9	Wing	H. Tail	V. Tail
10 GROSS AREA (SQ. FT.)	695.05		68.33
11 WEIGHT/GROSS AREA (LBS./SQ. FT.)	4.58		5.52
12 SPAN (FT.) ACTUAL	38.13		8.42
13 FOLDED SPAN (FT.)			
14			
15 SWEEPBACK - AT 25% CHORD LINE (DEGREES)			
16 - AT % CHORD LINE (DEGREES)	60.10		60.00
**17 THEORETICAL ROOT CHORD - LENGTH (INCHES)			
18 - MAX. THICKNESS (INCHES)			
***19 CHORD AT PLANFORM BREAK - LENGTH (INCHES)			
20 - MAX. THICKNESS (INCHES)			
***21 THEORETICAL TIP CHORD - LENGTH (INCHES)			
22 - MAX. THICKNESS (INCHES)			
23 DORSAL AREA, INCLUDED IN (FUSE.) (HULL) (V. TAIL) AREA (SQ. FT.)			
24 TAIL LENGTH - 25% MAC WING TO 25% Vertical Tail (Ft)			13.88

25 AREAS (SQ. FT.) Flaps	L.E.	T.E.		
26 Lateral Controls	Slats	Spoilers	Ailerons	
27 Speed Brakes	Wing	Fuse. or Hull	ELEVONS	67.15
28				
29				

30 ALIGHTING GEAR (LOCATION)	MAIN	NOSE		
31 LENGTH - OLEO EXTENDED - ℄ AXLE TO ℄ TRUNNION (INCHES)	62.5	43.5		
32 OLEO TRAVEL - FULL EXTENDED TO FULL COLLAPSED (INCHES)	10.0	8.0		
33 FLOAT OR SKI STRUT LENGTH (INCHES)				

34 ARRESTING HOOK LENGTH - ℄ HOOK TRUNNION TO ℄ HOOK POINT (INCHES)

35 HYDRAULIC SYSTEM CAPACITY (GALS.) Primary=3 (Approx) ; Secondary=4 (Approx)

36 FUEL & LUBE SYSTEMS	Location	No. Tanks	****Gals. Protected	No. Tanks	****Gals. Unprotected
37 Fuel - Internal	Wing			2	1050
38	Fuse. or Hull				
39 - External	Wing			2	460
40 - Bomb Bay					
41					
42 Oil	Engine			1	
43					

44

45 STRUCTURAL DATA - CONDITION	Fuel in Wings (Lbs.)	Stress Gross Weight	Ult. L.F.
46 FLIGHT	4095	25,500	10.5
47 LANDING	1706	22,071	4.5
48			
49 MAX. GROSS WEIGHT WITH ZERO WING FUEL		21,480	10.5
50 CATAPULTING			
51 MIN. FLYING WEIGHT		20,706	10.5
52 LIMIT AIRPLANE LANDING SINKING SPEED (FT./SEC.)			9.0
53 WING LIFT ASSUMED FOR LANDING DESIGN CONDITION (%W)			100
~~54 STALL SPEED - LANDING CONFIGURATION - POWER OFF (KNOTS)~~			
55 PRESSURIZED CABIN - ULT. DESIGN PRESSURE DIFFERENTIAL - FLIGHT (P.S.I.)			11.0
56			
57 AIRFRAME WEIGHT (AS DEFINED IN AN-W-11) (LBS.)			

*Lbs. of sea water @ 64 lbs./cu. ft.
**Parallel to ℄ at ℄ airplane.

***Parallel to ℄ airplane.
****Total usable capacity.

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3.1.3.1	Alternate Armament Loading (96 Rockets)	Lb 28,789
3.1.3.2	Take-off Gross Weight (Design Useful Load)	Lb 28,145

3.1.4 CENTER OF GRAVITY LOCATIONS:

Take-off gross weight, center of gravity location, wheels up:

Aft leading edge of MAC	% MAC	29.4
Above leading edge of MAC	Inches	6.9

Take-off gross weight, center of gravity location, wheels down:

Aft leading edge of MAC	% MAC	29.4
Above leading edge of MAC	Inches	5.5

Extreme positions of center of gravity possible in flight:

	Most Fwd		Most Aft	
	% MAC	Above L. E. MAC (In.)	% MAC	Above L. E. MAC (In.)
Wheels Up	23.8	8.8	----	----
Wheels Down	----	----	30.5	7.7

3.1.4.1 See Figure 3, Page 13, for Chart of Center of Gravity Limitations.

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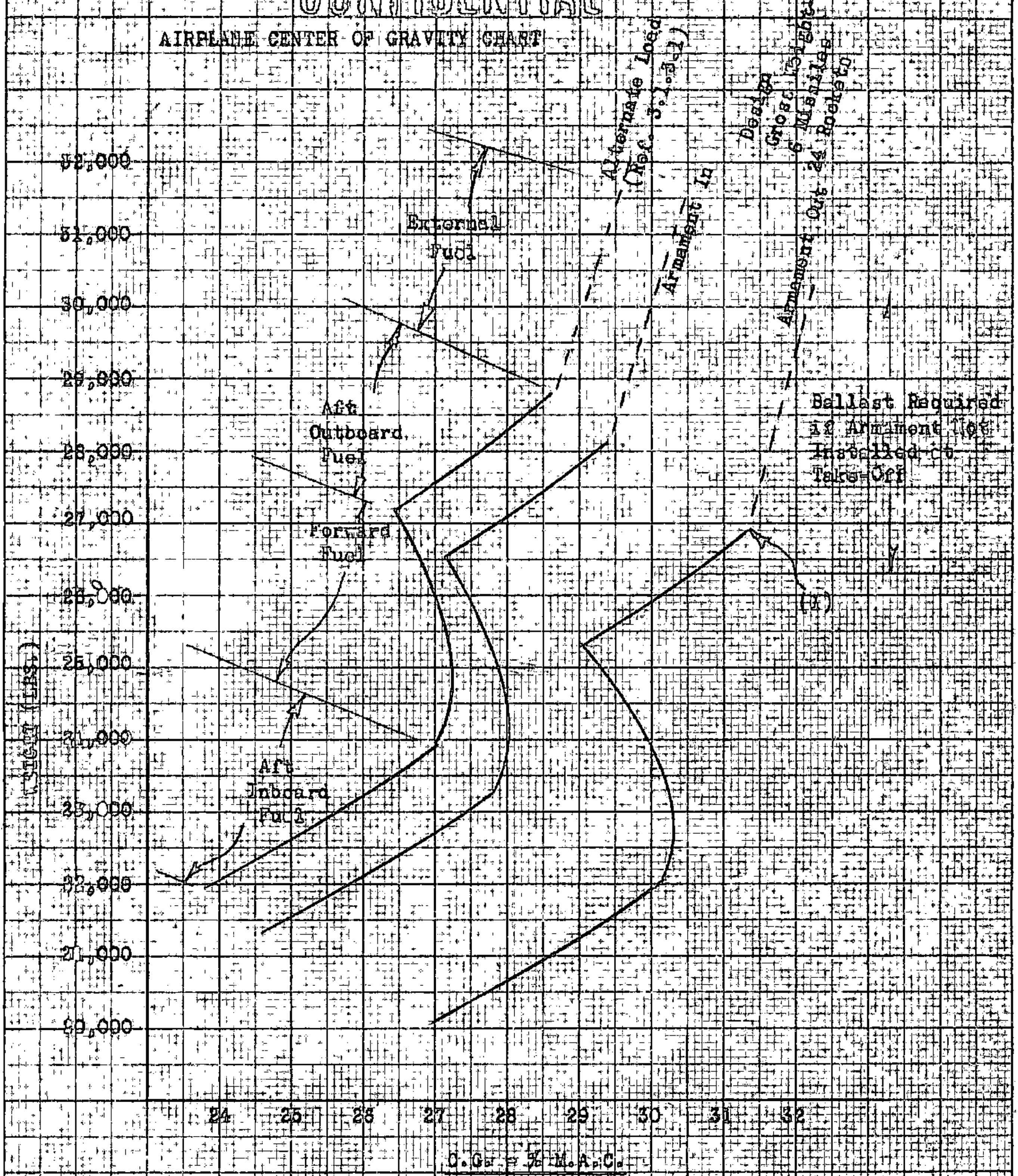
AIRPLANE CENTER OF GRAVITY CHART



AFT AERODYNAMIC LIMIT →

C.G.'s SHOULD BE KEPT AS FAR AFT AS POSSIBLE TO REDUCE TRIM DRAG

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Figure 3

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3.1.5 AREAS (Not to be used for inspection purposes):

Wing area, total, including elevons	695.05 sq ft
Elevon area, aft of hinge line	67.15 sq ft
Vertical Tail area, total	68.38 sq ft
Fin	60.9 sq ft
Rudder, aft of hinge	7.43 sq ft

3.1.6 DIMENSIONS AND GENERAL DATA (Not to be used for inspection purposes):

①

Wing:	
Span, maximum (theoretical)	39 ft 0.1 in.
Chord:	
At root	35 ft 7.6 in.
At tip (theoretical)	0
Mean aerodynamic	23 ft 9.1 in.
Airfoil section:	
Designation	NACA 0004-65 (Mod)
Thickness (percent chord)	4
Incidence (degrees):	
At root	0
At tip	0
Sweepback of leading edge	60° 6' 13"
Dihedral	0 degrees
Aspect ratio	2.2
Elevons:	
Span, each	12 ft 10.7 in.
Chord:	
Tip	2 ft 0.4 in.
Root	3 ft 1.9 in.
Tail:	
Vertical:	
Airfoil Section:	
Designation	NACA 0004-65 (Mod)
Thickness (percent chord)	4
Sweepback of leading edge	60 degrees
Aspect ratio	1.10

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3.1.6 DIMENSIONS AND GENERAL DATA (Cont)

Height over vertical tail:	
Reference line level	18 ft 2 in.
Three-point position	18 ft 2 in.
Length, maximum (including nose boom). . . .	68 ft.3.3 in.
Distance from 25% MAC to rudder 25% chord line	20 ft 4.2 in.
Ground angle (Tail down)	18 degrees
Wheel rim size:	
Main wheels	15 inches
Nose wheel	14 inches
Tire size:	
Main wheels	30 x 8.8
Nose wheel	24 x 5.5
Tread of main wheels	14 ft 6 in.
Wheelbase	23 ft 3.9 in.
Vertical travel of axle from extended to fully compressed position:	
Main wheels	10 inches
Nose wheel	8 inches
*Angle between lines joining center of gravity with points of contact of main wheel tires, static deflection of 1W (front elevation)	92° 22'
*Angle of line through center of gravity and ground contact point of main wheel tire to vertical line, reference line level, static deflection of 1W (side elevation).	26° 29' 55"

*At CG of point (1) on Figure 3, Page 13.

CONFIDENTIAL

3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS: (Not to be used for inspection purposes): Control surface and control movements on each side of neutral position for full movement as limited by stops, are as follows:

Rudder	25° right	25° left
Rudder pedals	3.25" fwd	3.25" aft
Elevons (as elevators)	25° up	10° down
Elevons (as ailerons)	9° up	9° down
Elevon Control (stick)	5" fwd	9" aft
Elevon Control (stick)	7" right	7" left
Speed brakes	45° maximum travel	

3.2 **GENERAL:**

3.2.1 **GENERAL INTERIOR ARRANGEMENT:** The interior of the fuselage shall be arranged from nose to tail to provide the following:

(a) A nose section including a radome to house the radar antenna and radar equipment of the fire control system.

(b) A pressurized pilot's compartment with seat, controls and equipment. A section to house the nose wheel in the retracted position is located below the floor of this compartment.

(c) An intermediate fuselage section to accommodate the communication and navigation equipment, and components of the fire control system.

(d) An armament section to house the missiles and rockets and their displacing gears. Armament provisions in this section shall be as specified in paragraphs 3.2.13.1 and 3.18. The compartment above this section will contain the refrigeration equipment. The forward wing spar shall attach to fuselage bulkheads in this section.

(e) An accessory section to accommodate miscellaneous hydraulic pneumatic, electrical and electronic equipment. Through the upper portion of this section passes the engine air intake ducts.

(f) A section to accommodate the turbo-jet engine, the electrical power supply, airframe controls and wells in the lower forward portion to house the main landing gear in the retracted position. The wing main and rear spars shall attach to fuselage bulkheads in this section.

(g) An aft compartment containing the engine afterburner, airframe control system valves and linkages.

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3.2.2 ㊻ (102) (138) (139) (140) MATERIALS: Materials shall be in accordance with applicable specifications and shall be selected in accordance with ANA Bulletin 143, except as otherwise noted herein and Appendix II. Castings shall be designed and inspected in accordance with Specification MIL-C-6021B.

3.2.3 WORKMANSHIP: Workmanship shall conform to high grade aircraft practice as defined by the Contractor's quality control procedures.

3.2.4 PRODUCTION, MAINTENANCE AND REPAIR: In the design of the airplane, consideration shall be given to ease of production, rapid power plant and equipment installation and ease of servicing and maintenance. Special attention shall be given to simplification of accessibility for routine checks of equipment and provisions for general field maintenance at advance bases where elaborate ground equipment is not usually available. Servicing provisions shall be designed to permit maximum utilization of the airplane under combat conditions. Special tools shall be limited to the practicable minimum and shall conform to Specifications MIL-D-8512 and MIL-D-8513.

3.2.5 (151) INTERCHANGEABILITY AND REPLACEABILITY: The component parts of the airplanes shall be interchangeable or replaceable, as the case may be, in accordance with and to the extend required by Specification No. AN-I-21, and shall be manufactured in conformity with the provisions of such specification, as noted in Appendix III herein.

3.2.6 FINISH: The finish for the airplane and parts shall be in accordance with the Contractor's finish specification which shall be in general accordance with Specification MIL-F-7179. In general, exterior paint is not required.

3.2.7 (233) (234) IDENTIFICATION AND MARKING: The airplane and components thereof shall be identified and otherwise marked in accordance with Specifications No. AN-M-13a (1) and 98-241058 (3).

3.2.8 EXTREME TEMPERATURE OPERATION: The aircraft as a whole, including aeronautical equipment, shall be so constructed that it will function satisfactorily in any or all temperature conditions that will be encountered. A ground temperature of -65°F has been established as the minimum temperature at which the aircraft shall operate.

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3.2.8 EXTREME TEMPERATURE OPERATION (Cont)

The couplete airplane, except the transparent portion of the pilot's enclosure, shall be capable of operating at a maximum stagnation temperature of 160°F (140°F boundary layer) based on an Air Force "Standard" day. The transparent portion of the pilot's enclosure shall be designed to a stagnation temperature of 205°F (194°F boundary layer) based on an Air Force "hot" day. The above requirements are as outlined in Convair Report No. ZU-8-023.

3.2.9 CLIMATIC REQUIREMENTS: The aircraft and its equipment shall not be adversely affected by other climatic conditions incident to the above temperature range, and shall be capable of transfer from one climate to another without penalty of extensive modification and adjustment.

3.2.10 LUBRICATION: Lubrication of the airplane shall be in accordance with Specification No. MIL-L-6880A.

(260)

3.2.11 STANDARD PARTS: The use of standard parts shall be in accordance with the requirements of Paragraph 3.2.2.

㉗ thru ㉝

㊳ (298)

3.2.11.1 Bearings shall meet the requirements of the applicable revision of the Handbook of Instructions for Aircraft Designers, except as noted in the specifications for bearings listed in Air Force Bulletin No. 59, dated 1 January 1951 and deviations of Appendix II.

㉞ ㉟ (61)

(64) (147) (148) (152)

3.2.12 CREW: The crew shall consist of one pilot.

3.2.13 EQUIPMENT INSTALLATION:

3.2.13.1 ARMAMENT: Complete provisions shall be made for mounting and firing the following weapons:

Rocket	2.75" FFAR	24
Guided Missile	GAR-1	6

OR

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3.2.13.1 **ARMAMENT: (Cont)**

Rocket	2.75" FFAR	24
Guided Missile	GAR-1B	6

OR

Rocket	2.75" FFAR	24
Guided Missile	GAR-1	3
Guided Missile	GAR-1B	3

3.2.13.1.1 ARMAMENT - ALTERNATE ARRANGEMENT: Provisions shall be made for carrying the following alternate armament arrangement:

Rocket	2.75" FFAR	96
Guided Missile		0

Rocket tube packages and other accessories for utilizing this alternate arrangement shall be provided.

3.2.13.2 COMMUNICATION AND NAVIGATION EQUIPMENT: See Section 3.17

3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION: The equipment and furnishings listed in Appendices I-A, I-B, and I-C of this model specification, shall be installed in the quantity and under the conditions specified herein.

3.3 **AERODYNAMICS:**

(165) (166)

3.3.1 GENERAL: The airplane shall be designed and constructed to provide the maximum surface smoothness and trueness of aerodynamic contour that are consistent with rapid and economical manufacturing techniques and that are required for high performance.

3.3.2 **STABILITY AND CONTROL:**

3.3.2.1 The stability and controllability of the airplane shall be in accordance with Specification No. 1815B, except as noted in Appendix II.

(154) thru (162) (164)

3.3.22 PERMISSIBLE AERODYNAMIC CENTER OF GRAVITY: The aft center of gravity limit of the airplane shall be as shown on Figure 3, Page 13.

3.3.2.3 It shall be possible to open the speed brakes in two seconds maximum from fully closed position to the position corresponding to 90% of nominal hydraulic system force, which corresponds to 2700 psi in the actuating cylinder. It shall be possible to open the speed brakes to any intermediate position.

3.3.2.4 The longitudinal deceleration provided by the speed brakes shall be at least 0.20g at 400 knots IAS.

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② thru ⑦ ⑩ thru ⑬ ㊲ ㊶ ㊷ ㊼ (51) (141)

3.4 **STRUCTURAL DESIGN CRITERIA:** Stress analysis criteria shall be as set forth in Convair Report No. ZU-8-023.

3.4.1 **LIMIT FLIGHT LOAD FACTORS:**

3.4.1.1 Combat Gross Weight . . . . 25,500 lb

Maneuver: Positive 7.g symmetrical for all speeds and altitudes. (For other conditions see Table I, page 24, herein)

3.4.1.2 Maximum Take-off Weight . . . . 31,559 lb

Maneuver: Positive 3.0g Negative -1.0g (See Table I, page 24 herein)

3.4.1.3 Minimum Flying Weight . . . . 20,706 lb

3.4.2 **LIMIT GROUND LOAD FACTORS:**

Taxiing:

Ground Maneuver @ Take-off (at maximum take-off weight of 31,559 lb) 2.0g

Landing:

Ground Landing (at normal take-off weight of 28,230 lb) . 2.0g

Ground Landing (at normal landing gross weight of 22,071 lb) 3.0g

3.4.3 **LIMIT DIVING SPEED:** See Figure 4, Page 23, for limit diving speeds.

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SECURITY INFORMATION

LIMIT DIVE SPEED

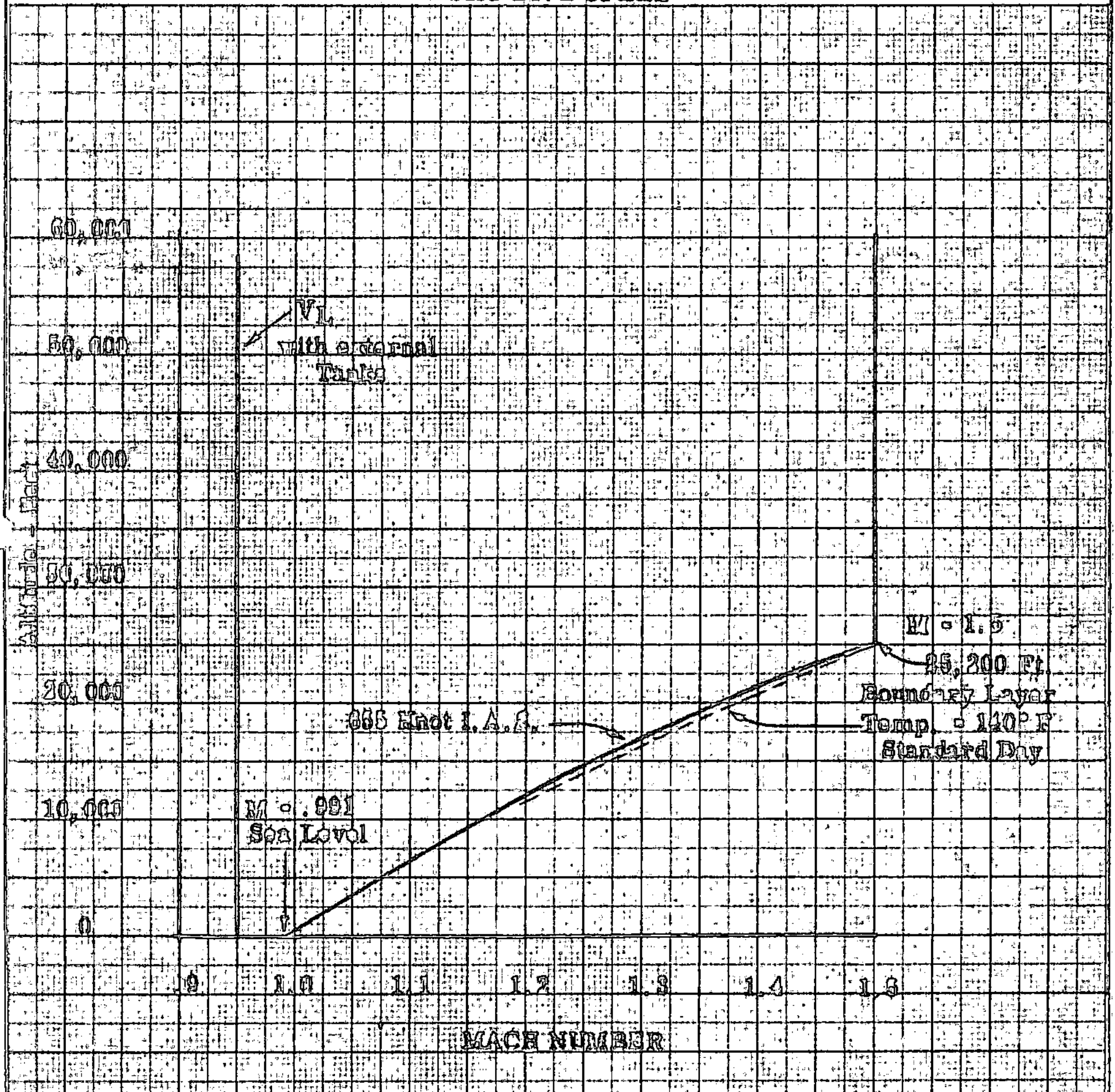

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FIGURE 4

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SUMMARY OF F-102A
DESIGN FLIGHT CONDITIONS

Configuration	Maneuver	Sym. Load Factor "g"	Min. Design Altitude	Design Speed Range	Remarks
Clean Airplane	Symmetrical	0 to + 7.0	Sea level	C_L=0.75 to V_L	
	Pullout	-3 to 0	12,000 ft.	C_L=0.75 to V_L	
	Gust - Symmetrical & Lateral	-	Sea level	0 to V_H	50 σ 1 /2 ft/sec sharp edge gust
	Rolling pullout	0 to +3.9	12,000 ft.	C_L=0.75 to V_L	Full available aileron.
	Rudder induced maneuvers	1.0	12,000 ft.	270 Kts to V_L	Rudder rapidly applied. Limited to automatic control authority or to 180 pound pedal force.
External Fuel Tanks on					
Tanks full (max. take-off wt.)	Symmetrical Pullout	-1.0 to +3.0	12,000 ft.	C_L=0.75 to M=.95	
Tanks empty	Symmetrical Pullout	-3.0 to +5.33	12,000 ft.	C_L=0.75 to M=.95	
Full & empty	Symmetrical & Lateral gust	-	Sea level	0 to M=0.89	50 σ 1 /2 ft/sec sharp edge gusts.
Armament Extended	Symmetrical Maneuver	-1.0 to +3.0	Sea level	C_L=.75 to V_L	
	Steady Sideslip	+1.0	12,000 ft.	C_L=.75 to V_L	Max. available with 180 pound pedal force.
Landing Gear Extended	Symmetrical Pullup	0 to 2.5	Sea level	0 to 270 Kts	
	Rudder induced Maneuver	1.0	Sea level	0 to 270 Kts	Full rudder rapidly applied.

Ref. Para 31 of ZU-0-023

TABLE I

CONFIDENTIAL

3.5 WING GROUP:

3.5.1 (88) DESCRIPTION AND COMPONENTS: The wing shall be a delta wing in planform and shall include two elevons, integral fuel tanks and provisions for attachement of main landing gear and other equipment.

3.5.2 CONSTRUCTION:

3.5.2.1 The wing shall be basically of full cantilever, stressed skin, high strength aluminum alloy construction employing spanwise spars of either or both forged and built-up shear web type and built-up shear web type chordwise ribs and bulkheads.

3.5.2.2 A portion of the wing interspar area outboard of the fuselage shall be designed for integral fuel tanks.

3.5.2.3 ⑨ The wing shall incorporate "wing fences," cambered leading edges, space and structural provisions for "non-evaporative, running - wet" type thermal anti-icing.

3.5.2.4 Removable reflex type wing tips shall be provided.

3.5.2.5 The wing shall include space and structural provisions to accommodate the installation of external fuel tank kits described in Section 3.12.9.4 herein.

3.5.3 ELEVONS: Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be riveted metal torque box and rib construction with metal covering. The elevon restraint shall be sufficiently rigid to prevent flutter and/or buzz.

Differential motion (as ailerons)	None
Distance from plane of symmetry to centroid of elevon area	8 ft 8.4 in.
Type of balance	None
Tabs	None

3.5.4 LIFT AND DRAG INCREASING DEVICES: None included as a portion of the Wing Group, See paragraphs 3.6.4.1 and 3.7.1.6.

CONFIDENTIAL

3.6 TAIL GROUP:

3.6.1 DESCRIPTION AND COMPONENTS: The tail group shall consist of a single vertical fin and rudder.

3.6.2 STABILIZER: Not applicable.

3.6.3 ELEVATOR: Not applicable.

3.6.4 ⑨ FIN: The fin shall be basically of riveted cantilever, high strength aluminum alloy construction attached to the fuselage and including provision for attachment of the rudder. The structure shall consist of forged spars and built-up shearweb ribs with stressed metal covering. The fin shall have space and structural provisions for leading edge "non-evaporative, running-wet" type anti-icing. The tip shall be electrically isolated by plastic material as required to satisfy the antenna requirements.

3.6.4.1 DROGUE PARACHUTE: A drogue parachute shall be installed at the base of the vertical tail to provide additional or auxiliary braking power for use on ice-covered runways or when landing on short runways.

3.6.5 RUDDER: The rudder shall be of metal honeycomb construction with metal covering. Trim tabs are not required. Balancing of rudder is not required. The rudder restraint shall be sufficiently rigid to prevent flutter and/or buzz.

3.7 BODY GROUP:

3.7.1 FUSELAGE:

3.7.1.1 DESCRIPTION: The fuselage shall be arranged as specified in paragraph 3.2.1.

3.7.1.2 ㊺ CONSTRUCTION: The fuselage shall be basically of riveted, high strength aluminum alloy construction with bulkheads and beltframes and stressed-skin metal covering. Magnesium skins may be used where practicable. Corrosion and heat-resisting material shall be used where required in the engine section.

3.7.1.3 CREW AND PERSONNEL STATIONS:

3.7.1.3.1 ⑰ ⑱ The pilot's compartment shall include provision for one ejection seat, flight controls, power plant and accessory controls and instruments, flight instruments and armament controls as specified in paragraph 3.18.3.5. The center of the instrument panel shall accommodate the pilot's display component of the fire control systems. The cockpit shall be arranged as agreed to by mock-up inspection.

3.7.1.3.2 The pilot's compartment shall be designed to be pressurized as specified in paragraph 3.20.1.1.1.

3.7.1.3.3 A ladder or platform (ground handling equipment) shall be required for the pilot to enter and leave the airplane.

3.7.1.3.4 (301) (304) The pilot's compartment shall be equipped with a hinged canopy, which shall be manually operated for normal entrance and exit and which shall be capable of being jettisoned by means of a canopy remover actuated as a part of the seat ejection sequence for emergency exit in flight. An alternate means shall be provided for jettisoning the canopy in a manner that will not accomplish the pre-ejection arming of the pilot's seat. Additional provisions are installed for jettisoning of cockpit canopy externally. The external provisions are located on the left hand side of the fuselage to permit ground personnel to jettison the canopy when the aircraft is in either "wheels-up" or "wheels-down" position. An instruction stencil shall be installed adjacent to the external controls.

3.7.1.3 CREW AND PERSONNEL STATIONS: (Cont)

3.7.1.3.5 The maximum practicable hemispherical visility shall be provided to either side of the forward line of sight, and to either side above and below the line of sight. The forward and downward visibility over the nose shall be 13.5° to the wing chord plane.

3.7.1.3.6 ⑭ ⑮ The pilot's windshield shall be fabricated from tempered glass in accordance with Specification No. MIL-G-8602, except for whatever modification may be necessary to incorporate electrical anti-icing and defogging provisions. The pilot's canopy shall be fabricated from transparent material in accordance with AN-P-45, except as noted in Appendix II.

3.7.1.3.7 The cockpit configuration shall be arranged to accommodate an ejection seat approved by WADC.

3.7.1.4 CARGO COMPARTMENTS: Not applicable.

3.7.1.5 EQUIPMENT COMPARTMENTS: Provisions shall be made to install the equipment as specified in paragraph 3.2.1. Ready access shall be provided for all components requiring adjustment and preflight checks.

3.7.1.6 SPEED BRAKES: Two speed brake panels shall be provided. These shall be located in the fin island stub and shall house the drogue chute. The brakes shall be hydraulically operated with no preselected positioning provisions. Locks shall be provided for the closed position only. Means shall be provided to hold the speed brake doors open to prevent inadvertent actuation of the doors during maintenance.

3.7.1.7 ROCKET AND MISSILE BAYS: Provisions to accomodate the armament as specified in Paragraph 3.2.13.1, shall be incorporated in the lower portion of the fuselage forward of the main landing gear.

3.7.1.8 WHEEL WELLS: Provision shall be made to house the nose wheel and portion of the two main wheel landing gear units in the fuselage.

3.7.1.9 ACCESSORY COMPARTMENT: Provisions shall be made to accommodate the installation of miscellaneous hydraulic, pneumatic, electrical and electronic equipment in the accessory compartment, which shall be located between the rocket bay and the main wheel wells.

3.7.2 HULL: Not applicable.

3.8 ALIGHTING GEAR:

㉑ ㉒ ㉓ (210)

3.8.1 GENERAL DESCRIPTION AND COMPONENTS: The landing gear shall be of the retractable, tricycle type, consisting of a nose gear unit and two main gear units.

3.8.2 MAIN LANDING GEAR:

3.8.2.1 DESCRIPTION: The main landing gear shall consist of two units attached to the wing structure and retracting into wells in the wing and fuselage. Each unit shall include a shock absorber strut and one wheel, tire, tube and brake.

3.8.2.2 (145) (146) WHEELS, BRAKES AND BRAKE CONTROL SYSTEMS: The main wheels shall be 30 x 8.8, Type VII and shall be equipped with pneumatic brakes. The brakes shall be actuated by means of toe controls which form an integral part of the pilot's rudder pedals. The brake system shall be in accordance with Specification No. AN-B-2, except as noted in Appendix II. Anti-skid devices are not required.

3.8.2.3 TIRES AND TUBES: The main wheel tires and tubes shall be 30 x 8.8, Type VII.

3.8.2.4 (227) thru (232) SHOCK ABSORBERS: Each main landing gear unit shall include one shock absorber strut designed in accordance with Specification No. 40228J (4) and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

3.8.2.5 ㉕ ㊽ (56) (282) RETRACTING, EXTENDING AND LOCKING SYSTEMS: The main landing gear shall be hydraulically retracted and extended by means of a control located convenient to the pilot. Safety devices shall be provided to prevent inadvertent retraction of the main landing gear when the airplane is on the ground. Positive mechanical locks shall be provided in both the extended and retracted positions. (Retracted gear is locked by doors.)

3.8.2.6 ㉖ DOORS AND FAIRINGS: Hinged doors and fairings shall be provided to cover the main landing gear wells in the fuselage and wing.

3.8.2.7 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the main landing gear units requiring inspection, maintenance and servicing including lubrication and for removal and replacement of parts subject to wear in service.

3.8.3 AUXILIARY LANDING GEAR (Tail Wheel): Not applicable.

(20)

3.8.4 AUXILIARY LANDING GEAR (Nose Wheel):

3.8.4.1 DESCRIPTION: The nose landing gear shall consist of a single steerable unit attached to the fuselage structure and retracting into a well in the nose. This unit shall include a shock absorber strut, steer damp unit and one wheel, tire and tube.

3.8.4.2 WHEEL: The nose wheel shall be 24 x 5.5, Type VII.

3.8.4.3 TIRE AND TUBE: The nose wheel tire and tube shall be 24 x 5.5, Type VII EHP.

3.8.4.4 SHOCK ABSORBER: The nose landing gear unit shall be equipped with one shock absorber strut designed in accordance with Specification No. 40228J (4), and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

(227) thru (232)

3.8.4.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS: The nose landing gear unit shall be hydraulically retracted and extended by means of the control specified in paragraph 3.8.2.5. Safety devices shall be provided to prevent inadvertent retraction of the nose landing gear when the airplane is on the ground. A positive mechanical lock shall be provided in both the extended and retracted positions.

3.8.4.6 DOORS AND FAIRINGS: A hinged door shall be provided to enclose the nose wheel well in the nose of the fuselage.

(26)

3.8.4.7 STEERING CONTROL: Provision shall be made for hydraulically steering the nose wheel by means of the pilot's rudder pedals. The nose wheel shall be steerable through 50° right or left. At 55° right or left the steer damp unit shall automatically disengage and permit swiveling through 360°.

3.8.4.8 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the nose landing gear unit requiring inspection, maintenance and servicing, including lubrication, and for removal and replacement of parts subject to wear in service.

3.8.5 IN FLIGHT OPERATING CONDITIONS: Positive operation shall be available during level flight at all speeds up to V_c=270 knots, and during accelerated flight operation (n_z=2.0) up to V_c=240 knots.

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3.9 ALIGHTING GEAR (Water Type): Not applicable.

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3.10 SURFACE CONTROL SYSTEM:

㊾ (63)

3.10.1 PRIMARY FLIGHT CONTROL SYSTEM: The primary flight control system shall be an irreversible, full-hydraulic power system, including artificial feel and trimming devices. The irreversible power actuators shall also serve as the surface actuators during automatic flight, and shall be designed to function in conjunction with the fire control system to provide satisfactory airplane performance during all automatic flight operations. A dual hydraulic power system shall be provided as described in paragraph 3.15.1. The control system shall be in accordance with Handbook of Instructions for Aircraft Designers (HIAD), except as noted in Appendix II.

㊿ (52) (53) (62) (163)

3.10.1.1 FLIGHT STATION CONTROLS: The cockpit elements of the flight control system shall include the pilot's rudder pedals, control stick and trim controls.

(54)

3.10.1.1.1 The pilot's control stick installation shall be complete with CFE single grip stick head. The control stick shall include complete provisions for the installation of a GFAE double grip type control stick head. These provisions shall be such as to permit interchangeability between the CFE single grip control stick head and the GFAE double grip control stick head, by the use of an adapter. (The GFAE double grip control stick head is a part of the fire control system, ref. paragraph 3.17).

3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS:

3.10.2.1 LIFE AND DRAG INCREASING DEVICE SYSTEMS: Provisions for the release and jettison of the brake parachute shall be installed in the cockpit conveniently located for use by the pilot.

3.10.2.2 SPEED BRAKES: Provision shall be made to extend and retract the speed brakes by a switch located on the throttle control lever.

3.10.3 (300) TRIM CONTROL SYSTEMS: The primary flight control system shall include trimming devices operable by the pilot through trim switches in the cockpit. When on pilot assist, the elevator trimming device shall automatically operate in such a manner as to prevent objectionable control stick and surface motion when the automatic control system is disengaged. Provisions shall be made to automatically place the trim system in take-off configuration by the operation of a single control located in the cockpit. Achievement of take-off trim shall then be indicated by a green light.

3.10.4 AUTOMATIC FLIGHT CONTROL DEVICES: Automatic flight control devices shall consist of the following systems.

3.10.4.1 PITCH AND YAW DAMPER SYSTEM: The function of this system shall be to augment the airplane dynamic stability. This system is applicable for all modes of operation (i.e. manual, pilot assist or automatic fire control) except direct manual.

3.10.4.2 (144) PILOT ASSIST SYSTEM: The function of this system shall be to provide a means of holding the airplane attitude constant for short periods of time while the fire control system is being locked on the target. This system is applicable only for airplanes having an interim fire control system without the automatic flight control system (AFCS).

3.10.4.3 PITCH G-LIMITER: The function of this system shall be to sense the approach of excessive normal load factors and shut-off the pitch and yaw damper system and pilot assist (or automatic fire control system) in time to prevent structural damage to the airplane. This system is applicable for all airplanes having pilot assist or fire control with AFCS.

3.10.4.4 AUTOMATIC FLIGHT CONTROL SYSTEM: Complete provisions for the automatic flight control system (AFCS) portion of the fire control system shall be incorporated so that when installed will permit automatic flight control of the airplane during the interception phase of attack following radar lock on. This system shall also independently provide the pilot assist functions noted in paragraph 3.10.4.2; this mode of operation shall be available to the pilot through manually controlled switches during normal flying (i.e., radar turned off) or the search phase.

3.10.5 MODES OF FLIGHT CONTROL: For the purpose of this specification the modes of operation shall be as follows:

3.10.5.1 DIRECT MANUAL: The direct manual mode of operation shall consist of control surface inputs by the pilot only. This is not intended to be a normal mode of operation.

3.10.5.2 MANUAL: The manual mode of operation shall consist of control surface inputs by both the pilot and the pitch and yaw damper system.

3.10.5.3 PILOT ASSIST: In the pilot assist mode of operation the rudder inputs are as in the manual mode and the elevon inputs originate from the pitch damper and pilot assist systems.

3.10.5.4 AUTOMATIC FIRE CONTROL: In the automatic fire control mode of operation the rudder inputs are as in the manual mode and the elevon inputs originate from the fire control computer.

3.11 (90) (98) (102) (104) ENGINE SECTION: The aft section of the fuselage shall be designed to accommodate the turbo-jet engine specified herein. The engine shall be shrouded and insulation shall be provided as necessary for cooling and fire protection purposes.

3.11.1 DESCRIPTION AND COMPONENTS: The engine section is located in the aft section of the fuselage and designed to accommodate the specified turbo-jet engine.

3.11.2 CONSTRUCTION: See paragraph 3.7.1.2, Fuselage Construction.

3.11.3 ENGINE MOUNTS: Provision shall be made to mount the specified turbo-jet engine.

3.11.4 VIBRATION ISOLATORS: Vibration isolators are not required.

3.11.5 (97) (101) (102) (138) FIREWALLS: A vertical athwartship airframe firewall shall not be required. For fire protection the engine shall be encased within an insulated fire resistant cannular shroud extending from the engine firewall aft. A longitudinal vertical firewall shall be installed between the wing fuel tanks and engine compartment from bulkhead 481 to 553 between the upper and lower wing attach angles. Firewalls may be constructed of titanium or titanium alloys. Fire resistant shrouds shall be installed around the fuel shut-off valves, and provided with overboard drains.

3.11.6 COWLING AND COWL FLAPS: Not required.

3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE: Removable panels and hinged doors shall be provided as required for access to the engine installation for inspection and maintenance.

3.11.8 (103) FIRE ACCESS DOOR: A spring-loaded fire access door shall be provided in the fuselage to accommodate rapid insertion of a ground fire extinguisher nozzle.

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3.12 PROPULSION:

3.12.1 GENERAL DESCRIPTION AND COMPONENTS: The propulsion group includes the turbo-jet engine specified below, the required accessories, and related systems. Engine inlet screen will not be required.

3.12.2 MAIN PROPULSION UNIT:

3.12.2.1 The airplane shall be equipped with one Pratt & Whitney J 57-P-23 turbo-jet engine in accordance with Pratt & Whitney Specification No. A-1686, and rated at 16,000 pounds of thrust, static at sea level. The engine shall be in accordance with Pratt & Whitney Drawing No. 229001, no change letter. (Dwg No. 208301 change ltr. BG-2 to be used until Dwg. No. 229001 becomes available.) Any future revisions that affect materially the J 57-P-23 installation shall be submitted to the Wright Air Development Center and the Contractor, in the form of Engineering Change Proposal, for approval.

3.12.3 AUXILIARY PROPULSION UNIT: Not required.

3.12.4 ENGINE-DRIVEN ACCESSORIES: Two hydraulic pumps and one tachometer generator shall be installed on and driven by the engine. A constant speed accessory drive shall be driven by the engine. through a gear and drive shaft arrangement.

3.12.5 AIR INDUCTION SYSTEM: Air inlets, with boundary layer air ducts and plows shall be located on each side of the fuselage adjacent to the pilot's compartment with ducts extending aft to the engine. The air inlet duct lips shall have provisions for anti-icing as specified in paragraph 3.20.2.1.

3.12.6 EXHAUST SYSTEM: The engine shall be furnished complete with exhaust system, including afterburner with a two position, flap type nozzle.

3.12.7 COOLING SYSTEM: Adequate cooling for the engine, engine accessories, aircraft equipment, components and structure shall be provided.

(105)(106)(107)

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3.12.7.1 In addition to the cooling air, supplementary protection is afforded the fuselage structure from overheat by the insulated shroud. (Reference paragraph 3.11 and 3.11.5.)

3.12.8 LUBRICATING SYSTEM: (108)

3.12.8.1 DESCRIPTION AND COMPONENTS: The specified engine shall be furnished complete with lubricating system, including oil tank, oil-fuel heat exchanger (oil cooler), pumps, lines, strainer and valves. An additional air/oil cooler shall be provided by the Contractor to maintain required oil temperature. (95) (109) (110) (111) (112) (113) (114)

3.12.8.1.1 A suitable access door shall be provided for oil tank servicing. (87) (96)

3.12.9 FUEL SYSTEM: (118)

3.12.9.1 DESCRIPTION AND COMPONENTS: The fuel system shall include tanks, lines, pumps, valves and controls. The system shall be designed for the use of fuels conforming to Specification No. MIL-F-5624A, Grade JP-4. The fuel system shall include the provisions specified in paragraph 3.5.2.5 to accommodate the installation and use of external fuel tanks. The system shall be placarded as to use of MIL-F-5572 gasoline as an emergency fuel and airplane performance limitations shall be included thereon. (115) (116) (121)

3.12.9.2 PUMPS: Two alternating current, electric motor-driven fuel booster pumps, conforming to Specification MIL-P-5238, shall be provided in the wing fuel tanks. Other pumps shall be as furnished with specified engine. (120)

3.12.9.3 TANKS - (Fixed): Two fuel tanks (one in each wing) consisting of three inter-connected compartments each, with a total net capacity of 1050 gallons (±2%) shall be provided as an integral part of the wing structure. (83) (84) (91) (92) (93) (99)

3.12.9.4 TANKS - (Jettisonable): Space and structural provisions shall be made to accommodate the installation and functioning of jettisonable external fuel tank kits, designed to accommodate use of the

3.12.9.4 TANKS - (Jettisonable): (Cont)

standard USAF 225 gal tanks, AF Drawing X53J9555. The kits shall include the pylons, ejector, attaching and release mechanism, wiring, switches, plumbing and air pressure lines. The provisions shall accommodate the installation of one tank kit, on the lower surface of the wing on both the left and right hand side. Means shall be provided to automatically shut-off the transfer pressurization system when the tanks are empty. The pylons and tanks shall be jettisonable, at the pilot's option.

3.12.9.5 (82) (94) (117) (119) VENT SYSTEM: The fuel tanks shall be vented in a manner consistent with fuel tank pressurization requirements. The vent system shall include the required lines, fittings, valves and equipment.

3.12.9.6 (77) thru (81) PIPING AND FITTINGS: Aluminum alloy fuel lines may be used throughout the fuel system. A shut-off valve protected by a fire resistant shroud, shall be provided at each wing tank outlet. All piping and connections in the fuel system shall be in accordance with applicable specifications and installed in accordance with the requirements of the HIAD, except as specified in Appendix II.

3.12.9.7 VALVES: Valves shall be provided as required and shall be in accordance with applicable specifications.

3.12.9.8 (122) STRAINERS AND FILTERS: A No. 8 mesh screen shall be installed in the fuel line near the engine.

3.12.9.9 (86) (288) (291) (292) QUANTITY GAGES AND FLOWMETERS: A single instantaneous rate expanding scale type flowmeter shall be provided for the turbine jet portion only. A fuel quantity gage compensated characterized type which is in general accord with Specification MIL-G-7818 except as noted in Appendix II, shall be provided. The quantity gage shall be installed in accordance with Specification MIL-G-7940, except as noted in Appendix II. Individual compartment reading by selection switching arrangement shall not be required. The fuel gage in normal position shall totalize all fuel in the integral tanks. Selective switching shall permit the gage to indicate quantity of fuel in either the #3 compartment left hand wing tank or the #3 compartment right hand wing tank.

CONFIDENTIAL

3.12.9.9.1 LOW LEVEL WARNING: Fuel low-level warning shall be provided, which is actuated by means other than the gage.

3.12.9.10 DRAINAGE PROVISIONS: Provision shall be made to drain fuel from the tanks.

(100)

3.12.9.11 FUEL EVAPORATION AND TRANSFER CONTROL: Air shall be bled from the engine compressor section and shall be used to pressurize the fuel tanks to reduce fuel evaporation and to provide fuel transfer.

3.12.9.12 REFUELING PROVISIONS: Pressure refueling provisions shall comply with the requirements set forth in Memorandum Report No. MCREXP-524-3006 with the exception of suction defueling as noted below, and deviations noted in Appendix II.

(85)

3.12.9.13 DEFUELING PROVISIONS: The fuel booster pumps shall be used for defueling on the ground.

(95)

(293) thru (297)

3.12.10 WATER INJECTION SYSTEM: Not applicable.

3.12.11 PROPULSION SYSTEM CONTROLS: A power control lever shall be provided for the pilot and connected to the power lever on the specified engine.

(57)

(58)

3.12.12 STARTING SYSTEM: The starting system shall include an air turbine starter requiring an external source of compressed air. The main engine starting controls shall be located for use by the pilot. The starter pressure regulating and shut-off valve shall not be required on the aircraft.

3.12.13 PROPELLER: Not applicable.

3.12.14 ROCKET PROPULSION SYSTEM: Not required.

CONFIDENTIAL

3.13 **AUXILIARY POWER PLANT**: The airplane shall be designed to receive compressed air for ground starting from a type MA-1 power unit, or equivalent, except as modified by paragraph 3.12.12 herein.

3.13.1 A quick disconnect fitting located in the right hand wheel well, shall be provided for use with the ground compressor. This fitting is used for connecting air duct from ground compressor for engine starting.

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT:

3.14.1 INSTRUMENTS: The following instruments shall be located on the
(55) pilot's instrument panel, subpanel, console, or as specified herein:

(123) One combination air speed indicator and Machmeter
One altimeter
(127) One attitude gyro
One rate-of-climb indicator
One turn and slip indicator
One radio magnetic course indicator
One course deviation indicator
One pilot's display (part of fire control system)
One fuel quantity indicator and selector switch
One clock
One cabin pressure altimeter
One single hydraulic pressure indicator and selector switch
One fuel flow indicator
One tachometer
One turbine outlet temperature indicator
One alternating current voltmeter and selector switch
Three landing gear position indicators
One engine pressure ratio gage
One outside air temperature indicator
One magnetic stand-by compass (in pilot's canopy)
One afterburner position indicator

3.14.2 NAVIGATION EQUIPMENT: See Section 3.17

3.14.3 INSTALLATION: Instruments shall be installed in accordance with
(124) (125) (126) the HIAD, and other applicable specifications, except as noted in
(129) (174) (175) Appendix II. The pitot tube shall be installed in accordance with
(176) (177) (223) MIL-I-5072 and shall be located on a boom extending forward from
(258) (259) the tip of the radome. Provisions shall be made for operation of the integral electric heater.

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS:

3.15.1 HYDRAULIC SYSTEM:

3.15.1.1 (204) thru (208) (211) (219) **DESCRIPTION AND COMPONENTS:** The hydraulic systems shall be in accordance with Specification No. MIL-H-5440, except as noted in Appendix II. The hydraulic configuration shall consist of two separate continuously-operating, closed center systems. The systems shall be of equivalent capacity, each developing approximately one-half the full hinge moment. Each system shall be powered by an engine-driven 3,000-psi, variable volume pump. One system will be considered as the primary system, to be used for controls only. The other system will be known as the secondary system, to be used for controls plus utility items such as landing gear, speed brakes, emergency A.C. generator, and nose wheel steering. Dual-tandem cylinders shall be provided on the elevons. A single tandem cylinder shall be provided on the rudder. Dual control valves shall be provided for each surface. The primary and secondary systems need not and shall not be interconnected, except mechanically, at the surface control valve and actuating cylinders. Either system shall be capable of flying the airplane equally well under reduced maneuverability in the event of failure of the other. All utility items, when not in use, shall be shut off from the secondary system. If the primary system is inoperative, the landing gear may be lowered by an emergency method, thus relieving possibility of failure of the secondary system at landing. To provide for failure of the power plant, which is the only source of continuous power for the control systems, an emergency hydraulic pump driven by a ram air turbine will supply power to the primary hydraulic system for controls. The ram air turbine will be used to provide hydraulic power to permit landing the airplane and at flight speeds where windmilling engines will not provide sufficient power to the engine driven hydraulic pumps. Hydraulic pumps shall be approved by Wright Air Development Center.

3.15.1.2 SUMMARY OF ACTUATED ITEMS: The hydraulic system shall be used to actuate the following items:

Surface control system
Landing gear extension and retraction and doors
Speed brakes
Nose wheel steering
Emergency A.C. generator

3.15.2 PNEUMATIC SYSTEMS:

(60) (212) thru (218)

3.15.2.1 LOW PRESSURE PNEUMATIC SYSTEM: A low pressure pneumatic system shall be installed for air conditioning, as described under paragraph 3.20.

3.15.2.1.1 SUMMARY OF FUNCTIONS: The low pressure pneumatic system shall provide:

Hydraulic Reservoir Pressurization
Cabin pressurization and air conditioning
Fuel tank pressurization
Air intake duct anti-icing
Canopy seal pressurization
Anti "G" suit pressurization
Windshield spot rain clearing
Glycol tank pressurization
Elevon feel intelligence system pressure.

3.15.2.2 HIGH PRESSURE PNEUMATIC SYSTEM: A high pressure pneumatic system shall be provided in accordance with Specification No. MIL-P-5518, except as noted in Appendix II.

3.15.2.2.1 DESCRIPTION AND COMPONENTS:

The high pressure pneumatic system obtains its energy from air stored in the air flasks which are charged to 3,000 psi from a ground source. A pressure regulator reduces and regulates the air pressure for use in the armament and rudder feel systems. The

3.15.2.2.1 DESCRIPTION AND COMPONENTS: (Cont)

normal capacity of the high pressure pneumatic system shall be capable of three cycles of armament door operation and one cycle of all armament displacement racks. For the alternate loading of the armament racks the capacity of the high pressure pneumatic system shall be capable of four cycles of armament door operation and two cycles of all armament displacement racks. Sufficient pressure and volume shall remain to operate emergency lowering of the landing gear, extension of the ram air turbine, operation of the drogue chute and wheel brakes.

3.15.2.2.1.1 SUMMARY OF ACTUATED ITEMS: The high pressure pneumatic system shall be used to actuate the following items:

Emergency landing gear extension
Armament displacement gear
Main landing gear brakes
Armament bay doors
Ram air turbine unlatch and extension
Rudder feel system cylinder
Drogue chute release

3.16 ELECTRICAL:

3.16.1 DESCRIPTION: The electrical system shall consist of a 28-volt direct current power supply and a 115/200 volt, 400 cycle three-phase alternating current power supply. Provisions shall be made for emergency operation of essential A.C. and D.C. loads. Emergency operation of essential A.C. loads shall be from a hydraulic driven A.C. generator.

3.16.2 ELECTRICAL POWER SUPPLY:

3.16.2.1 (269) (273) thru (278) DIRECT CURRENT: Direct current shall be supplied by a 200 ampere, 30-volt air cooled generator which shall be driven from an accessory gear pad on the input side of a constant speed drive. The input gear box shall be driven from the engine through a suitable gear and drive shaft arrangement. The generator shall be in accordance with Contractor Specification 8-06301 and the control panel shall be a standard type B-3. The distribution system shall include an "essential" and a "non-essential" bus with provisions for automatically disconnecting the "non-essential" bus in event of generator failure. A 24-volt, 24 ampere-hour battery shall be installed and connected to the essential bus. Means shall be made to inspect battery fluid level and to check specific gravity of the fluid. Provisions for voltage adjustment in flight is not required. Provision shall be made to adjust the voltage safely while the aircraft is on the ground.

✲3.16.2.1 (269) (273) thru (278) DIRECT CURRENT: Direct current shall be supplied by a 200 ampere, 30-volt air cooled generator which shall be driven from an accessory gear pad on the input side of a constant speed drive. The input gear box shall be driven from the engine through a suitable gear and drive shaft arrangement. The generator and control panel shall be in accordance with Contractor Specification 8-06370. The distribution system shall include an "essential" and "non-essential" bus with provisions for automatically disconnecting the "non-essential" bus in event of generator failure. A 24-volt, 24 ampere-hour battery shall be installed and connected to the essential bus. Means shall be made to inspect battery fluid level and to check specific gravity of the fluid. Provisions for voltage adjustment in flight is not required. Provision shall be made to adjust the voltage safely while the aircraft is on the ground.

✲ A/C Serial No. AF53-1371 and on

CONFIDENTIAL

3.16.2.2 ALTERNATING CURRENT: The alternating current power shall be supplied by a 26 KVA, 120/208 volt, three-phase, air cooled A.C. generator driven by a hydro-mechanical constant speed drive. The constant speed drive shall be driven from the engine through a suitable gear and drive shaft arrangement as specified in paragraph 3.12.4, and shall be controlled to maintain the frequency of the A.C. generator to within ±1.0 percent. The generator and regulator shall be in accordance with Contractors Specification 8-06301 and the control panel shall be a standard type G-1.

*3.16.2.2 ALTERNATING CURRENT: The alternating current power shall be supplied by a 30 KVA, 120/208 volt, three-phase, air cooled A.C. generator driven by a hydro-mechanical constant speed drive. The constant speed drive shall be driven from the engine through a suitable gear and drive shaft arrangement as specified in paragraph 3.12.4, and shall be controlled to maintain the frequency of the A.C. generator to within ±1.0 percent. The generator, regulator and control panel shall be in accordance with Contractors Specification 8-06371.

3.16.3 ELECTRICAL POWER CONVERSION:

3.16.3.1 INSTRUMENT POWER: Instrument power shall be supplied by a 200/115-volt, three-phase transformer. This power shall be used to operate the electrically-driven alternating current gyro instruments. A 115/26V single phase transformer shall be installed for autosyn instruments and J-2 compass. These transformers shall receive power from the airplane's alternating current bus.

3.16.3.2 EMERGENCY POWER:

3.16.3.2.1 DIRECT CURRENT: In the event of failure of the airplane D.C. generator, power shall be supplied for the essential bus only, from the battery.

3.16.3.2.2 ALTERNATING CURRENT: Emergency power, in the event of failure of the main A.C. generator, shall be supplied from a 1-KVA, three-phase, 120/208-volt A.C. generator driven by a hydraulic motor.

CONFIDENTIAL

* A/C Serial No. AF53-1371 and on

CONFIDENTIAL

3.16.4 (59) (261) (263) (264) (270) (284) EQUIPMENT INSTALLATION: Electrical equipment shall be installed in accordance with Specification MIL-E-7563 and MIL-E-7080 as applicable, except as noted in Appendix II. The battery shall be so installed as to permit ease of replacement and shall be vented as required. Equipment shall be installed to operate in ambient temperatures within the limits of applicable specifications, except that higher temperatures during periods of time not to exceed five minutes will be permissible.

3.16.5 (59) (178) thru (184) (186) (187) (188) (190) thru (203) (262) WIRING: Wiring shall be installed in accordance with Specification No. MIL-W-5088, except as specified in Appendix II.

3.16.6 (59) BONDING: The airplane and equipment shall be bonded as required by Specification No. MIL-B-5087. Shielding shall conform to Specification No. MIL-W-5088.

3.16.7 (134) (265) (266) (280) CONTROLS: Switches, circuit breakers, rheostats and resistors shall be provided as required and shall be in accordance with applicable specifications, or as otherwise approved by the WADC.

3.16.7.1 (283) POWER CONTROL: The electrical power control shall consist of a battery switch, a d.c. generator control switch an a.c. generator control switch, and an emergency electrical power cut-off switch. Failure of either generator shall be indicated by one of two warning lights which are on the "Master warning light" system panel, as outlined in Paragraph 3.16.11.3. Disconnection of nonessential buses in event of generator failure shall be automatic. Both generator control switches shall provide positions for "ON", "OFF", and "RESET". The emergency cut-off switch shall disconnect all power generation equipment (both a.c. and d.c.) and the battery from the buses.

CONFIDENTIAL

3.16.8 (59) LIGHTING:

3.16.8.1 GENERAL: Lighting shall be installed in accordance with Specification No. MIL-L-6503 (USAF). All lighting fixtures and accessory equipment shall be in accordance with applicable specifications or as otherwise approved by the WADC.

3.16.8.2 ⑲ (143) (236) thru (241) (246) thru (249) (252) (287) INTERIOR: Instrument lighting shall be in accordance with Specification MIL-L-6423A, except as noted in Appendix II. Console panels shall be edge-lighted type in accordance with Specification No. MIL-P-7788, except as noted in Appendix II. Thunderstorm lighting, with off-on switch, shall be provided. All interior lighting, except the flight instrument primary lighting shall be operated from the A. C. bus. All primary lighting shall be on the essential bus. Secondary and thunderstorm lights shall be on the non-essential bus.

3.16.8.3 (242) thru (245) (254) thru (257) EXTERIOR: Exterior lighting shall be in accordance with Specification No. MIL-L-6503 (USAF) and the applicable portions of Specification No. MIL-L-6730, except as noted in Appendix II. A taxi light shall be provided on nose landing gear door. Landing lights shall be installed on both main landing gear wing fairing doors and shall provide the required illumination. The wing tip, tail and fuselage lights shall be of a special design and shall be subject to approval by WADC. The position lights shall be operated from the essential A. C. bus through transformers.

3.16.9 (279) IGNITION AND STARTING CONTROL SYSTEM: The ignition and starting control system shall be designed to the requirements of the manufacturer of the specified engine. Controls shall be located for ease of operation and shall be subject to WADC approval.

3.16.10 RECEPTACLES:

3.16.10.1 (272) EXTERNAL POWER: Both direct and alternating current external power receptacles shall be provided for ground operation. The receptacles shall be located as approved by the Mock-Up Board and shall be accessible from the ground. The receptacles shall energize both the essential and non-essential buses when the respective external power plugs are connected. The D.C. and A.C. power receptacles shall conform to AN2552-3A and AN3114-1B respectively.

CONFIDENTIAL

3.16.10.2 (185) (189) **ELECTRICAL CONNECTORS:** Electrical connectors shall conform to Specification No. MIL-C-5015, except as noted in Appendix II, and except that where special connectors are required, they shall be subject to WADC approval.

3.16.10.3 (271) **FUEL NOZZLE GROUNDING JACK:** A fuel nozzle grounding jack shall be provided adjacent to the fuel tank filler connection and shall be identified in accordance with Drawing No. AND 10439.

3.16.10.4 **STATIC GROUND:** A static ground shall be provided on the landing gear in accordance with USAF Drawing No. 49B7572.

3.16.11 **INDICATORS:**

3.16.11.1 (281) **ALARMS:** Landing gear warning horn not required.

3.16.11.2 ㉔ (128) **SIGNAL ASSEMBLIES:** Three landing gear signal assemblies, Specification No. MIL-I-6839, shall be provided on the instrument panel to indicate to the pilot the position of the landing gear units. A cabin altitude warning is not required.

3.16.11.3 (250) (251) (286) **WARNING LIGHTS:** Warning lights for the master warning system, hydraulic system (pressure low), and fire and overheat detector system shall be provided on the instrument panel. Adjacent to the canopy latch handle shall be located the canopy "UNLOCKED" warning light. In the translucent handle of the landing gear control lever shall be located the landing gear "UNSAFE" warning light. The "HYDRAULIC PRESSURE" warning light shall flash for indication of failure of one system and burn continuously for indication of failure of both hydraulic systems. A switch shall be provided adjacent to the hydraulic warning light to permit the pilot to extinguish the flashing light (after one system failure) and re-set the warning system for indication of failure of the other hydraulic system. In addition a sub-panel shall be provided on which all non-critical warnings will be grouped. Each non-critical warning signal shall energize a pair of bulbs placed behind a translucent panel. Illumination of the bulbs shall permit the lettering on the panel to become readable. Adjacent to this panel the "Master Warning Light" re-set

CONFIDENTIAL

3.16.11.3 WARNING LIGHTS: (Cont)

switch shall be provided. The master warning system shall operate as follows: when warning occurs, other than the four listed above, both the master warning light and the appropriate lights on the sub-panel shall illuminate. The pilot may operate the "Master Warning Light" re-set switch, thereby extinguishing and resetting the light. (Reset operation need not be accomplished prior to additional failures indicating on the sub-panel.) The system shall then be ready for the next warning. The individual warning lights on this system shall operate independent of the master warning system. A switch shall be provided to test all the lights on the system. The warnings to be included shall be as approved by the Mock-Up Board. The warning lights on the sub-panel shall be of a design approved by WADC.

3.16.11.4 METERS: An alternating current voltmeter shall be provided with a selector switch to check various alternating current voltages.

(267)(285)(286)

3.16.12 ELECTRIC DRIVES: Electric motors shall be in general accordance with Specification No. AN-M-40. Specifications shall be prepared for all electro-mechanical actuators used in the airplane. These specifications shall include applicable environmental tests, test reports, design operating loads and design static loads. These specifications shall be submitted for WADC review.

3.16.13 (268) RELAYS: Relays shall be in accordance with applicable specifications and drawings, except that where special units are required they shall be subject to WADC approval. Relays shall be hermetically sealed where required due to danger of explosion or for operation at altitude.

3.16.14 BOOSTER COIL: Not applicable.

3.16.15 FILTERS: Filters shall be installed only where necessary to insure compliance with Specification No. MIL-I-6051. The type of filters used shall be as approved by WADC.

3.16.16 LOAD ANALYSIS: Electrical load analysis Specifications MIL-E-7016 and MIL-E-7017 shall form a part of this specification.

CONFIDENTIAL

3.17 (182) (225) (226) ELECTRONICS: Installation and provisions shall be made by the Contractor, to the extent specified in paragraph 3.17.1 on aircraft listed below for the installation of electronic equipment. Provisions shall be in general accordance with Specification No. MIL-I-8298.

3.17.1 EQUIPMENT: The following radio and radar equipment shall be installed by the Contractor. The equipment shall be bench, pre-flight, and flight tested in accordance with applicable specifications listed herein.

	Description	Nomenclature	Installation Specification	Performance Specification
	UHF Command	AN/ARC-34	WCLC-52-92	MIL-R-8272 (USAF)
	Interphone	AN/AIC-10	WCES-52-38	MIL-I-6999 (USAF)
	Marker Beacon Receiver	AN/ARN-12	- - -	MIL-M-5345(USAF)
	Glide Slope Receiver	AN/ARN-18	X-7296	MIL-R-7263
	VHF Navigation Receiver	AN/ARN-14	X-7289A	MIL-R-6334 (USAF)
	Ground Air IFF	AN/APX-6A	MIL-R-9298	MIL-R-6335 (USAF)
#	Fire Control System	MG-3(Hughes)	(See Paragraph 3.17.4.7.1)	

Complete provisions for the following equipment shall be made:

	Ground Air IFF	AN/APX-25A (Manual Control) (Alternate equipment installation of AN/APX-6A)	MIL-T-9289	- - -
%	Fire Control System	MG-3(Hughes)	(See Paragraph 3.17.4.7.1)	

CONFIDENTIAL

A/C Serial No. AF53-1799 and on

% A/C Serial No. AF53-1791 thru 1798

3.17.1 EQUIPMENT: (Cont)

The following equipment shall have space and weight provisions:

Description	Nomenclature	Installation Specification	Performance Specification
OMNI-- DME	AN/ARN-21	WCES-52-50	- - -

The following equipment shall have space provisions:

UHF Direction Finder Group	AN/ARA-25	WCES-52-53	- - -

3.17.1.1 CONTROL PANELS: The following radio and radar control panels shall be installed:

(130)
(144)

	Nomenclature	Description
	C-1057/ARC-34	UHF Command Control Panel
	C-996/A	VHF Navigation Control Panel
#	MG-3	Controls (See paragraph 3.17.4.7.1)
	C-1158/APX	IFF Transponder Control

Complete provisions for the following radio control panels shall be made:

	C-1128/APX-25	IFF Coder Group Control
%	MG-3	Controls (See paragraph 3.17.4.7.1)

Space and weight provisions for the following radio controls shall be made:

C-866/ARN-21	OMNI-DME Control

3.17.1.2 ANTENNAS: All antennas except the GFAE, fire control system radar antenna shall be Contractor furnished and installed in accordance with applicable military specifications, except as noted in

A/C Serial No. AF53-1799 and on % A/C Serial No. AF53-1791 thru 1798

3.17.1.2 ANTENNAS: (Cont)

Appendix II. Antennas shall be provided for the required systems as listed in Paragraph 3.17.1.

3.17.1.3 INTERFERENCE: Radio interference tests shall be conducted and necessary suppression accomplished in accordance with Specification MIL-I-6051A.

3.17.1.4 WIRING: Wiring shall be installed in accordance with Specification No. MIL-W-5088 except as otherwise stated herein and in Appendix II. All wiring shall be identified and coded in accordance with applicable USAF wiring diagrams. Wiring diagrams shall be submitted for approval.

3.17.1.5 COOLING: The Contractor shall provide adequate cooling for radio, radar, and fire control components. Such cooling shall be subject to the approval of the WADC.

3.17.2 COMMUNICATIONS EQUIPMENT:

3.17.2.1 COMMAND SET - AN/ARC-34: One UHF communications unit shall be installed in the center electronics compartment. This equipment is used for aircraft to aircraft or aircraft to ground communications. The control shall be installed on the left hand side console.

3.17.2.1.1 (235) The UHF antenna, part of the fin-type antenna assembly, shall be located on the vertical fin, and shall be designed and installed by the Contractor to meet, as a minimum, the performance requirements of Specification No. MIL-A-6224A (USAF) and the requirements of Paragraph 3.17.1.2, except as noted in Appendix II.

3.17.2.2 LIAISON SET: Not applicable.

3.17.2.3 INTERPHONE: The necessary components or circuits of intercommunications set AN/AIC-10 shall be installed to provide for the use of microphone M-32/AIC (Oxygen mask) and headset H-75/AIC (helmet). Provisions shall be made for ground interphone communications between the cockpit and the nose wheel area.

3.17.2.4 MICROPHONE AND HEADSETS: Wiring provisions for a microphone and headset shall be made in accordance with Paragraph 3.17.2.3. Two microphone switches, AF Specification No. 32549, shall be installed; one on the throttle control and one on the control stick grip.

3.17.2.5 FILTER EQUIPMENT: Not applicable.

3.17.2.6 RECORDING EQUIPMENT: Not applicable.

3.17.3 NAVIGATION EQUIPMENT:

3.17.3.1 RADIO COMPASS: Not applicable.

3.17.3.2 MARKER BEACON EQUIPMENT - AN/ARN-12: The receiver shall be located in the forward right-hand armament bay. This equipment is used for receiving the 75 megacycle marker transmission. The indicator light, part of the VHF navigation course indicator, is mounted on the instrument panel.

3.17.3.2.1 The antenna for the marker beacon receiver shall be located in the aft section of the left hand center missile bay door. It shall be installed to meet the performance requirements of Specification No. MIL-A-5999 (USAF) and Paragraph 3.17.1.2.

3.17.3.3 INSTRUMENT APPROACH EQUIPMENT:

3.17.3.3.1 GLIDE PATH RECEIVER AN/ARN-18: The receiver shall be installed in the center electronics compartment. Choice of the appropriate glide path and localizer channels shall be afforded from the navigation receiver control unit located on the right hand side console. Deviation indication shall be provided by the VHF navigation course indicator located on the instrument panel.

3.17.3.3.1.1 The glide path antenna shall be installed in the nose of the fuselage enclosed by the radome and shall meet the performance requirements of Specification No. MIL-A-6325 (USAF).

3.17.3.3.2 LOCALIZER RECEIVER: See Paragraph 3.17.3.7.

CONFIDENTIAL

3.17.3.4 ALTIMETER - RADIO: Not applicable.

3.17.3.5 RADIO RANGE RECEIVER: Not applicable.

3.17.3.6 HOMING ADAPTER AN/ARA-25: Space provisions shall be made for components of the ARA-25 Direction Finder Group.

3.17.3.6.1 Space provisions for the antenna shall be made on the under side of the fuselage forward of the nose landing gear.

3.17.3.7 VHF NAVIGATION RECEIVER - AN/ARN-14: The receiver and power unit shall be installed in the center electronics compartment. The receiver provides navigational facilities in the omni range and localizer frequencies. The control shall be installed in the right hand side console. One deviation course indicator and one radio magnetic course indicator shall be installed in the instrument panel. One radio control indicator shall be installed in the center electronics compartment.

3.17.3.7.1 A compass signal power amplifier shall be installed in the center electronics compartment.

3.17.3.7.2 The VHF Navigation antenna, part of the fin tip antenna assembly, shall be located on the vertical fin and shall meet performance requirements of Specification No. MIL-A-6300 (USAF).

3.17.3.8 OMNI - DME EQUIPMENT - AN/ARN-21: Space and weight provisions shall be made for the omni DME equipment in the center electronics compartment. Space and weight provisions for the controls and indicator shall be provided on the right hand side console.

3.17.3.8.1 The L-Band antenna, installed on the top centerline of the fuselage, shall be used with the AN/APX-6A equipment prior to installation of the AN/ARN-21 equipment.

(253)

3.17.3.9 ARBITRARY COURSE COMPUTER: Not applicable.

3.17.4 RADAR:

3.17.4.1 SEARCH EQUIPMENT: Not applicable.

CONFIDENTIAL

3.17.4.2 **LORAN EQUIPMENT:** Not applicable.

3.17.4.3 **AUTOMATIC GROUND POSITION INDICATING EQUIPMENT:** Not applicable.

3.17.4.4 **IDENTIFICATION EQUIPMENT:**

3.17.4.4.1 **IDENTIFICATION SET - AN/APX-6A (Ground-to-Air IFF):** The receiver transmitter unit shall be installed in the center electronics compartment. The control shall be located on the right hand side console.

3.17.4.4.1.1 **L-BAND ANTENNAS:** One antenna located on the top centerline of the fuselage aft of the canopy and one antenna located on the bottom centerline of the fuselage forward of the nose wheel well shall be installed by the Contractor to meet the performance requirements of Specification No. MIL-A-6543 (USAF) and Paragraph 3.17.1.2, except as noted in Appendix II. Until the AN/ARN-21 equipment is installed, AN/APX-6A system shall also utilize the L-Band antenna located on the top centerline of the airplane. (See Paragraph 3.17.3.8.1.)

3.17.4.4.1.2 As an alternate installation for AN/APX-6A, complete provisions for AN/APX-25 ground-to-air IFF shall be installed. Complete provisions for the controls shall be made in the right hand console. Complete provisions for the keyer shall be made. The L-Band antennas described in Paragraph 3.17.4.4.1.1 shall be utilized.

3.17.4.4.2 **IDENTIFICATION SET (Air-to-Air IFF) - AN/APX-27 (Part of the Fire Control System):** The transmitter, amplifier, duplexer and coupling component provisions shall be installed in the lower section of the vertical fin. The receiver and synchronizer shall be located in the aft accessory compartment. The provisions for the control shall be installed on the right hand side console.

3.17.4.4.2.1 The IFF antenna shall be located in the fin tip and shall be an integral part thereof. The antenna shall be designed by Hughes Aircraft Company and shall be fabricated and installed by the Contractor in accordance with the following Hughes Aircraft Company drawings: - A464A-4315, A464A-4315-1, A464A-4315-3, A464A-4315-4 and A464A-4315-7.

3.17.4.5 INTERROGATION EQUIPMENT:

3.17.4.5.1 AIR-TO-AIR INTERROGATOR-RESPONSER - AN/APX-26 (Part of the Fire Control System): The equipment provisions shall be installed in the forward electronics compartment (nose section) in conjunction with the radar fire control system. The provisions for the control shall be located in the cockpit as a part of the radar antenna control.

3.17.4.6 RADAR BEACON: Not applicable.

3.17.4.7 FIRE CONTROL SYSTEM: MG-3 Hughes Aircraft Company.

3.17.4.7.1 # The MG-3 fire control system shall be installed. However, complete provisions only shall be made for the following sub-systems:

AFCS	Automatic Flight Control System
AN/APX-26	Interrogator-Responser, Air-To-Air IFF (Reference Paragraph 3.17.4.5.1)
AN/APX-27	Transponder, Air-To-Air IFF (Reference Paragraph 3.17.4.4.2)
- - -	Data Link
AILS Coupler	Automatic Instrument Landing System

3.17.4.7.1 % Complete provisions shall be made for the MG-3 fire control system. The system shall include the following system capabilities in addition to the basic radar, computer, power supply and missile auxiliaries:

AFCS	Automatic Flight Control System
AN/APX-26	Interrogator-Responser, Air-To-Air IFF (Reference Paragraph 3.17.4.5.1)
AN/APX-27	Transponder, Air-To-Air IFF (Reference Paragraph 3.17.4.4.2)
- - -	Data Link
AILS Coupler	Automatic Instrument Landing System
Optical Sight	Non-Computing

3.17.4.7.2 In general, the nose section of the aircraft shall consist of a radome to house the radar antenna and an equipment compartment for the radar and computer sub-systems of the MG-3 system.

A/C Serial No. AF53-1799 and on

% A/C Serial No. AF53-1791 thru 1798

3.17.4.7.3 Cockpit controls and optical sight shall be arranged as specified in Paragraph 3.7.1.3.1.

3.17.4.7.4 In general, the missile auxiliaries shall be located adjacent to the missile bays.

3.17.4.7.5 Provisions for automatic flight control and AILS components of the MG-3 system shall be located around the center electronics compartment.area. The pilot assist system shall be installed in the same area as the AFCS components until such time as the AFCS components are available. The AFCS control provisions shall be installed in the right hand console.

3.17.5 ELECTRONIC COUNTERMEASURE: Not applicable.

3.17.6 ELECTRONIC GUIDANCE SYSTEM:

3.17.6.1 GUIDE LINKS AND SYSTEMS: Provisions shall be made for data link equipment as part of the fire control system. The data receiver, converter-duplexer provision shall be located in the refrigeration compartment. The controls provisions shall be located in the right hand console.

3.17.6.2 A data link flush UHF antenna shall be installed on the door of the center electronics compartment and shall meet, as a minimum, the performance requirements of Specification No. MIL-A-6224A (USAF) and the requirements of Paragraph 3.17.1.2, except as noted in Appendix II.

3.17.7 STATIC DISCHARGERS: Not applicable.

3.17.8 EMERGENCY RESCUE TRANSMITTER: Not applicable.

3.17.9 RADOME: A quickly detachable radome shall be provided in the nose of the fuselage to accomodate the fire control system radar antenna. The radome shall be de-iced as specified in Paragraph 3.20.2.1. The radome shall incorporate provisions for supporting a nose instrumentation boom as specified in Paragraph 3.14.3.

3.17.10 **GROUND TEST EQUIPMENT OUTLETS:** One receptacle, Type AN-3102A-18-9S, shall be installed which will accept multiple test equipment plug arrangements, provided by an available AF type service cord. The receptacle shall be mounted in the nose wheel well.

3.18 ARMAMENT:

(131)

3.18.1 DESCRIPTION: The armament installation shall consist of the specified aircraft rockets and guided missiles and related equipment.

3.18.2 FIXED GUNS: Not required.

3.18.3 ROCKETS AND MISSILES:

3.18.3.1 DESCRIPTION: The armament installation shall consist of GAR-1 and/or GAR-1B missiles and 2.75 inch rockets stored within the bays in the fuselage. Space provisions shall be provided for GAR-1A as defined by Hughes Drawing 142346, dated 2-3-54. The missile bays shall provide for alternate loading arrangements as specified in Section 3.2.13.1. The rockets and missiles shall be fired automatically by the fire control system. Manual firing of the rockets may be accomplished with the aid of the optical sight.

3.18.3.2 ROCKET LAUNCHER: The rocket launchers shall be an integral part of the missile bay doors which shall close flush with the fuselage contour when the launcher is in the retracted position. Means shall be provided for placing the rockets in firing position and for retracting the launcher to the closed position. A rocket firing electrical interlock shall be provided as a part of the rocket launcher to permit rocket firing only when the launcher is in the extended position. An additional rocket firing arrangement shall consist of six pods carried on the missile displacement gear described in Paragraphs 3.18.3.3 and 3.2.13.1.1.

3.18.3.3 MISSILE LAUNCHER: Means shall be provided for carrying six missiles within the fuselage. Actuators shall be provided to extend the missiles prior to launching and for retracting the launcher after launching. The missile bay doors shall be provided with a locking arrangement to lock the doors in the closed position. Means shall be provided to hold the doors open on the ground. With the doors open and gear extended it shall be possible to load the missiles onto the launchers.

3.18.3.4 ALIGNMENT: The missiles shall be so aligned that, in the firing position, their axes will be fixed approximately three degrees down at the front with respect to the chord plane. The rockets shall be aligned approximately two degrees down to the chord plane in the firing position.

3.18.3.5 ARMAMENT CONTROLS:

3.18.3.5.1 The complete firing system shall be a part of the Fire Control System, except for the armament control panel, rocket and missile firing intervalometer and related circuitry.

3.18.3.5.1.1 Manually-operated momentary switches shall be provided in the nose wheel well for opening and closing the armament doors, and to raise and lower the displacing gear for loading.

3.18.3.5.2 It shall be possible to check the continuity of the rocket and missile firing circuits on the ground before armament installation, with the aid of ground test equipment.

3.18.3.5.3 An interlock switch shall be provided to prevent inadvertent firing of the missiles or rockets when the landing gear is in the extended position.

3.18.3.5.4 OPTICAL SIGHT: An optical sight shall be installed in the cockpit as a component of the fire control system.

3.18.3.6 EXTENSION AND RETRACTION TIME: The extension time and the retraction time for the armament doors shall each be approximately 1.0 seconds. The extension time for each launcher, with or without the missile, shall be approximately 0.9 seconds. The retraction time for each launcher, with or without the missile, shall be approximately 0.9 seconds. These times shall not be exceeded at any flight speed to limit speed (V_L) and normal load factor (N_Z) of plus or minus 1g from level flight (i.e., 0 to plus 2g). Positive extension and retraction shall be available at all speeds to V_L with the design or alternate weight configurations for a flight acceleration of ±2g from level flight (i.e., +3g and -1g).

3.18.4 FLEXIBLE GUNS: Provisions for flexible guns are not required.

3.18.5 **STORES:** Provisions for external armament stores are not required.

3.18.6 **PASSIVE DEFENSE:** Not required.

(132)

3.18.7 **BORE SIGHTING:** Bore sighting provisions shall be provided for the fire control system.

3.19 FURNISHINGS AND EQUIPMENT:

3.19.1 ACCOMMODATIONS FOR PERSONNEL:

(136)

3.19.1.1 (16) (133) An ejection seat conforming to Contractors Specification 8-04322, to be submitted to WADC for approval, and in general accordance with Specification MIL-S-9479, shall be installed for the pilot. The seat shall include provisions for attachment and use of an automatic opening lap type safety belt and a shoulder harness. The seat shall accommodate the pilot wearing the emergency rescue equipment specified in paragraph 3.19.6.

3.19.1.2 (289) (290) A pressure regulating valve assembly, ejection, Type M-8 for anti-"G" suit, shall be installed in accordance with Specification No. MIL-I-7890, except as noted in Appendix II.

3.19.2 MISCELLANEOUS EQUIPMENT:

(135)

3.19.2.1 (142) An instrument panel shall be provided forward of the pilot for the flight and engine instruments specified in paragraph 3.14.1. The instrument panel shall be in accordance with Specification No. MIL-I-5997, except for deviations noted in Appendix II.

3.19.2.2 (223) (224) (302) A combination flight report holder, map and data case shall be provided.

3.19.2.3 (299) An airplane check list holder shall be provided. The check list shall conform to Specification No. 40149.

3.19.2.4 (66) (137) A means for maintaining forward vision during rain conditions, through a limited area of at least one windshield panel on one side of the pilot's enclosure, shall be provided and shall be capable of operating at speeds corresponding to take-off, approach and landing.

3.19.2.5 (167) Provisions for food and drinking water are not required.

3.19.2.6 Provisions for pyrotechnics are not required.

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3.19.2.7 A vertical baffle forward of instrument panel, on centerline of airplane, extending from structure at "V" of windshield down to radar scope when in use, shall be installed to reduce light reflections on canopy and windshield. The baffle may be retracted against the radar scope when not in use.

3.19.3 FURNISHINGS:

3.19.3.1 Thermal and acoustical insulating material shall not be provided.

⑧

3.19.4 EMERGENCY EQUIPMENT: A light shall be provided on the instrument panel which indicates fire in the engine accessory compartment and overheat in the engine after burner compartment. This light shall flash for indication of overheat and burn steady for indication of fire. Fixed fire extinguishers are not required. Portable and hand-type extinguishers are not required.

(65)

3.19.5 OXYGEN EQUIPMENT: A high pressure oxygen system shall be provided consisting of the equipment specified in Appendix I, including the necessary tubing, fittings, brackets, etc.

3.19.6 EMERGENCY RESCUE EQUIPMENT: The emergency rescue equipment for the pilot shall consist of a seat-type survival kit and back-type parachute having dimensions of 16 x 25 x 5 inches.

3.19.7 SPARE BULBS: Spare light bulb stowage shall be installed in a location readily accessible to the pilot.

(252)

CONFIDENTIAL

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT:

3.20.1 ⑥⑧ thru ⑦① ⑦③ thru ⑦⑥ (303) AIR CONDITIONING: Air for pressurizing and air conditioning the cockpit is obtained from engine compressor bleed. This air passes through an "expansion turbine" type refrigeration package consisting of a ram air cooled heat exchanger (first stage) and an expansion turbine (second stage).

Control of cabin air pressure is obtained by the use of an automatic cabin pressure regulator located inside the cockpit.

Control of cabin air temperature is obtained through the use of a cabin temperature control device which controls butterfly position of a valve which by-passes bleed air around the refrigeration package.

Control of cabin air by the pilot is as follows:

A three position switch in the cockpit allows selection of:

(a) Cabin air "PRESSURE"
(b) Cabin air "OFF"
(c) Cabin air "RAM"

On emergencies, the pilot may shut-off all air to the cockpit and maintain pressurization for a short period, or he may select ram air into the cockpit for ventilation purposes.

3.20.1.1 IN-FLIGHT AIR CONDITIONING:

3.20.1.1.1 ⑥⑦ ⑦② OCCUPIED COMPARTMENTS: Air for pressurizing, heating, cooling and ventilating the cabin shall be as specified in paragraph 3.20.1. The operating pressure differential shall not exceed 5 psi. An altitude versus pressure schedule is shown on Figure 5, page 70.

3.20.1.1.2 OTHER COMPARTMENTS:

3.20.1.1.2.1 ROCKET AND MISSILE BAY: Air discharging from refrigeration compartment will enter missile bay. Temperature sensitive portions of the missiles will be maintained between 0° and 130° F.

3.20.1.1.2.2 ELECTRONIC EQUIPMENT BAYS: Ram cooling air shall be supplied to the electronic equipment bays as necessary to insure satisfactory operation of the equipment,

3.20.1.1.2.3 MISCELLANEOUS COMPARTMENTS: Cooling air shall be provided by means of ram air or cockpit discharge air for the following compartments: forward electronics compartment, nose wheel well, intermediate electronics compartment, and refrigeration compartment.

3.20.1.2 GROUND AIR CONDITIONING:

㊱ ㊵

3.20.1.2.1 OCCUPIED COMPARTMENTS: On the ground, with the canopy closed, the pilot's compartment shall be conditioned by means of air bled from the compressor section when the engine is in operation. During standby (engine not running) conditioned air shall be supplied by an auxiliary source (ground support equipment) through an external flexible duct into the cockpit with the canopy partially open.

3.20.1.2.2 OTHER COMPARTMENTS:

3.20.1.2.2.1 ROCKET AND MISSILE BAYS: Conditioned air to the rocket and missile bay is not provided. Temperature sensitive portions of the missiles will be maintained between 0° and 130° F. by ground support equipment.

3.20.1.2.2.2 ELECTRONIC EQUIPMENT COMPARTMENTS: On the ground the electronic equipment located in the forward and intermediate compartments shall be cooled as necessary to insure satisfactory operation of the equipment using the same air source as specified in paragraph 3.20.1.2.1 when the engine is in operation, or by use of an external air source supplied through a duct fitting located in the nose wheel well, when the engine is not in operation.

3.20.2 ANTI-ICING

3.20.2.1 (168) thru (173) ANTI-ICING OF NONTRANSPARENT AREAS: Space and structural provision shall be installed in the wing, tail and fuselage for "non-evaporative, running-wet" type anti-icing in the wing and fin leading edges. The engine air intake duct lips shall be anti-iced by means of engine bleed air. The specified engine includes built-in anti-icing protection. Engine icing detector system shall be provided. The radome shall be de-iced by freezing point suppressant liquid spray system. This de-icing liquid shall be a special load item. Anti-icing shall be in accordance with Specification No. 40395-C, except as noted in Appendix II.

3.20.2.2 (220) (221) (222) ANTI-ICING, DEFROSTING AND DEFOGGING OF TRANSPARENT AREAS: The portion of the windshield through which visibility is required for landing and use of the optical sight shall have provisions for anti-icing. Inner surfaces of windshield shall be defrosted and defogged in accordance with Specification No. MIL-T-5842. Defogging and defrosting of the canopy will not be provided, as noted in Appendix II.

3.21 PHOTOGRAPHIC: Not required.

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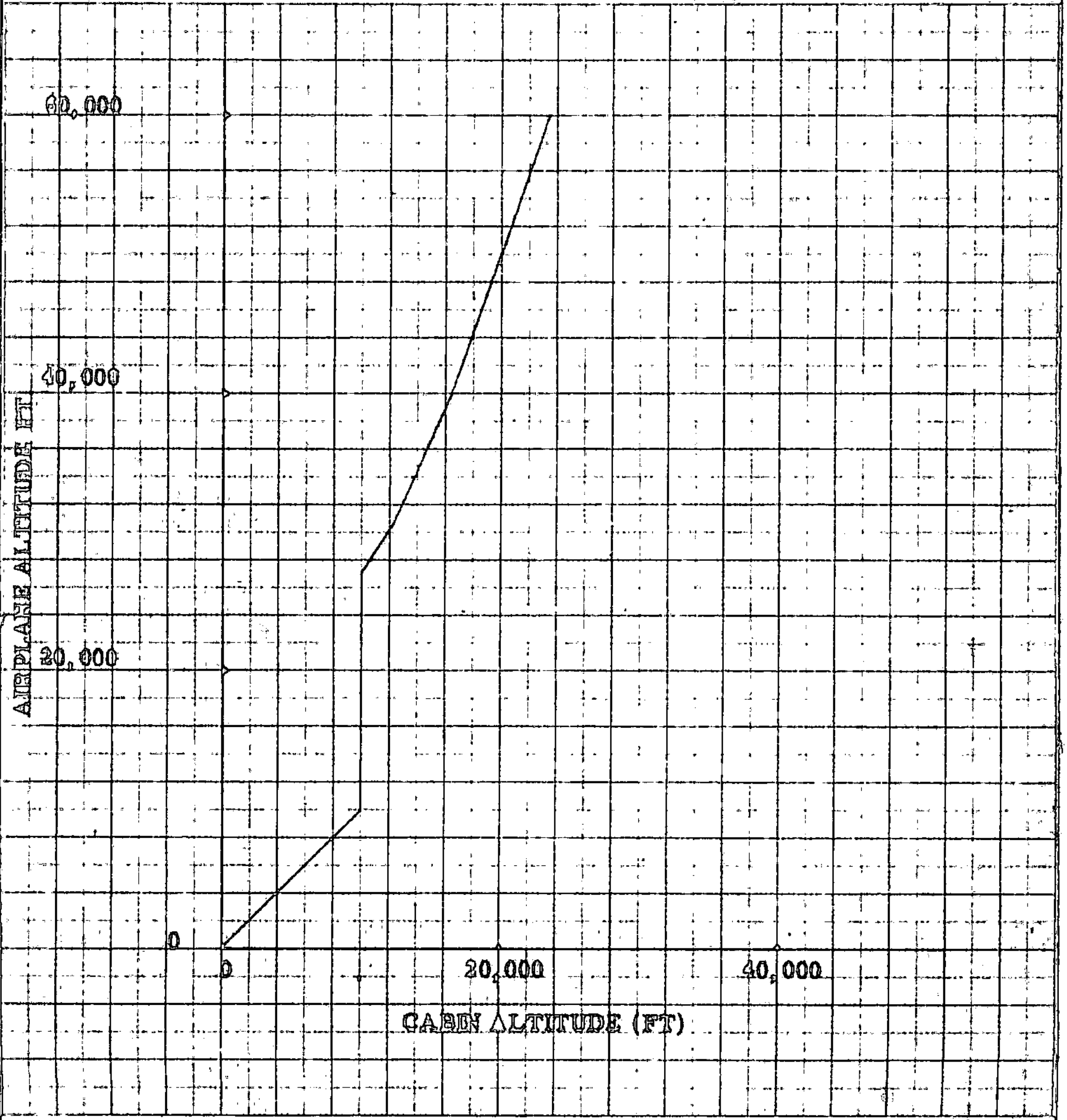
CABIN PRESSURIZATION SCHEDULE



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SECURITY INFORMATION

FIGURE 5

3.22 AUXILIARY GEAR: Auxiliary gear shall include provisions for towing, jacking, mooring, hoisting and leveling.

3.22.1 TOWING PROVISIONS:

3.22.1.1 MAIN LANDING GEAR: Tow lugs, or equivalent, with an inside diameter of not less than 2 inches shall be provided to permit attachment of a tow bar or cable for towing the airplane forward or backward.

3.22.1.2 NOSE LANDING GEAR: A hollow nose wheel axle with an inside diameter of 3/4 inch shall be provided to permit attachment of a tow bar for towing the airplane forward or pushing backward. An alternate arrangement in which an inside diameter of 3/4 inch extending one inch inboard from each outer face of the axle will be acceptable.

3.22.2 (149) (150) JACKING PROVISIONS: Provision shall be made to jack the airplane as required by the HIAD. The provisions shall be in accordance with Specification No. AN-J-5 (2), except as specified in Appendix II. Fuselage jack pads shall incorporate mooring provisions and shall be recessed wherever possible.

3.22.3 ㊸ MOORING PROVISIONS: Provision shall be made to moor the airplane in accordance with the requirements of the HIAD, except as specified in Appendix II. Fuselage mooring lugs or rings shall be integral with the fuselage jack pads, and/or attached to a common fitting and shall be recessed wherever possible.

3.22.4 ㊴ HOISTING PROVISIONS: Provisions shall be made for hoisting the airplane and components in accordance with the requirements of Specification No. MIL-S-5944, except as noted in Appendix II.

3.22.5 ㊹ LEVELING: Leveling provisions consisting of two sets of leveling lugs, and a two jig point arrangement for measuring in accordance with Specification No. MIL-M-6756 shall be provided.

3.22.6 COVERS AND SHIELDS: Covers and/or shields for air scoop and exhaust openings, transparent glass and enclosures, wing, tail, and miscellaneous openings, conforming to Specifications No. MIL-C-5778, MIL-C-5462 and MIL-S-6451, as applicable, shall be furnished as specified in Appendix I-D of this specification.

3.22.7 SPECIAL GROUND SUPPORT EQUIPMENT: Special ground support equipment, when required, shall conform to Specification MIL-D-8512 and MIL-D-8513 and shall be furnished as determined through normal provisioning procedures.

3.22.7.1 The airplane and its components shall be designed to require a minimum quantity of support equipment for normal maintenance replacement of parts, or for servicing.

4. SAMPLING, INSPECTION AND TEST PROCEDURES:

4.1 The method of inspection and tests shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

(153)

5. PREPARATION FOR DELIVERY:

5.1 Preparation for delivery shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

6. NOTES:

6.1 EXPLANATORY INFORMATION: See applicable data, Appendix III.

6.2 ADDITIONAL INFORMATION: See applicable data, Appendix III.

6.3 DEFINITIONS: Where the phrases "complete provision for" "structural provision for" and "space provision for" are used, the intent is defined as follows:

6.3.1 COMPLETE PROVISION FOR: "Complete provision for" a specific item of equipment, or assembly or installation, shall mean that all supports, brackets, tubes and fittings, electrical wiring, hydraulic lines, etc., are to be installed and adequate weight and space allocated so that the equipment can be installed without alteration to the specified equipment or the airplane, and that no additional parts are required for installation, other than the item itself. Standard stock items such as nuts, bolts, cotter pins, etc., need not be furnished.

6.3.2 STRUCTURAL PROVISIONS FOR: "Structural provisions for" a specific installation shall mean that the primary structure will be structurally adequate for the installation, but that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be provided. Structural provisions also include weight of the equipment involved as an element of alternate weight.

6.3.3 SPACE PROVISIONS FOR: "Space provision for" a specific installation shall mean that space only shall be allocated for the installation, and that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be provided. "Space provision for" does not imply that adequate attaching structure is provided, unless otherwise stated in each instance.

6.3.4 SPACE AND WEIGHT PROVISIONS: Same as "Space Provisions For" in paragraph 6.3.3 above, except the weight of the equipment as installed shall be included in "Design Gross Weight."

6.3.5 OTHER DEFINITIONS: Definitions of the HIAD, NACA technical Report No. 474, and Specification No. MIL-I-6252 (USAF) are considered applicable to the airplane described herein.

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		LANDING GEAR (Weight Empty)		
1	1	Wheel Assy - Nose, 24 x 5.5 - Type VII, MIL-W-5013A, S47R459Q	41-1150	20.0
2	2	Wheel Assy - Main Landing, 30 x 8.8 EHP, Type VII, MIL-W-5013A, S52E1235B (Bendix 148050)	41-1675 -or- 41-1153	88.0
3	2	Brake Assy - Main Landing (for 30 x 8.8 wheel) Type VII, MIL-W-5013A, S52E1235(B) (Bendix 148320)	41-1156	160.6
4	2	Casing - Main Wheel, 30 x 8.8 EHP, High Speed (18 ply rating), Type VII, MIL-C-5041, S52J1096E	41-1677	97.9
5	2	Tube - Main Landing, 30 x 8.8 (fabric base), Type VII, MIL-T-5014A, S52J1096	41-1678	15.3
6	1	Casing - 24 x 5.5 Extra High Pressure, High Speed, 12-Ply Rating, Type VII, MIL-C-5041, S48F84 Chg "L"	41-7831	20.6
7	1	Tube - 24 x 5.5 Extra High Pressure, Fabric Base, Type VII, MIL-T-5014B	41-7832	3.7
		POWER PLANT (Weight Empty)		
*1	1	Engine - Turbo Jet, Including Flap Type Afterburner Nozzle, P & W J57-P-23 (as installed)	35-1608	5058.0
**1a	1	Engine - Turbo Jet, P & W J57-P-11	35-1602	
2	1	Starter - Pneumatic, Aircraft Engine, Type MB-3, MIL-S-5866A (Pressure regulating and shut-off valve not installed on airplane)	42-9400	31.3

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* A/C Ser. No. 53-1807 and subsequent ** A/C Ser. No. 53-1791 thru 53-1806

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		POWER PLANT (Weight Empty)(Cont)		
3	1	Constant Speed Accessory Drive consisting of one each of the following:		
a		Gear Box Engine - Mounted Sundstrand #M-634800	48-529	15.0
b		Transmission and Gear Box Sundstrand #M-634810	48-530	90.0
c		Drive Shaft, Sundstrand #M-634828.	48-528	3.0
d		Covered Drive Shaft, Sundstrand #634838. . . .	48-527	1.0
e		Negative "G" Valve, Sundstrand #M-636109 . . .	48-534	4.0
		INSTRUMENT (Weight Empty)		
☆1	1	Altimeter - Pressure, Sensitive, AN5760-5, MIL-A-6863	60-602	1.3
2	1	Indicator - Cabin Air Pressure, Pressurized Aircraft, 1-7/8 in. Dial, Type MA-1, MIL-I-5099A (Aer).	60-603	0.4
☆☆2a	1	Altimeter - Pressure, Sensitive, TypeMB-2 . .	60-606	1.3
3	1	Clock - 1-Hour Elapsed Time, 12-Hour Dial, Type A-13A, MIL-C-6499	60-1201	0.4
4	1	Remote Compass - Type J-2, Consisting of		
	1	Compensator - Transmitter, Slaved Gyro Magnetic Compass, 27635	60-1479	1.1
	1	Control - Directional, Electrically-driven Gyro, Type S-3A, MIL-C-6231A, AM #1	60-1480	7.0
	1	Transmitter - Remote Compass (unstabilized), Type C-2, 27635	60-1483	(incl. with 60-1479)

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☆ A/C Ser. No. AF53-1791 thru 53-1818 ☆☆ A/C Ser. No. AF53-1371 and on

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

INSTRUMENT (Weight Empty)(Cont)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
4 (Cont)	1	Amplifier - Single Channel, Integral Slaved Gyro Magnetic Compass, Type A-2, MIL-A-6859 . .	60-1702	6.6
	1	Amplifier - Two-Channel, Integral, Type B-7A, 21074-D	60-1705	5.0
5	1	Compass, Magnetic, 28V, Pilot Stand-by AN5766-4	60-1447	0.8
*6	3	Indicator - Position, Landing Gear, Individual Indicating, 28-volt, D.C., Type AN5839-1 MIL-I-6839	60-3170	0.4
7	1	Indicator - Airspeed, Mach Number and Maximum Allowable Speed, Pitot Static, Type ME-2, Exhibit WCL-484, MIL-I-8269.	60-4938	1.3
*8	1	Indicator - Turn and Slip, 4-min Turn, 28-volt D.C., Type MD-1, MIL-I-7627	60-5702	1.9
**8a	1	Indicator, Turn and Slip, 4-min Turn, 28-volt D.C., Type MD-1A	60-5703	1.9
9	1	Indicator - Attitude, Type J-8, MIL-I-5133B . .	60-5933	2.8
10	1	Indicator - Rate-of-Climb, Type AN5825-7, MIL-I-7721	60-6901	1.3
**11	1	Tube - Pitot Static, 24-volt, AN5816-2, MIL-T-5420A	60-9200	1.0
12	1	Indicator - Tachometer, Electric, 0 - 110% RPM, Single, MS28000-1, MIL-I-5573A.	61-222	0.9
13	2	Transmitter - Hydraulic Pressure, Synchro, MS28005-5, 0 - 4000 psi, 320° Movement, MIL-T-7113	61-1455	2.3
14	1	Indicator - Hydraulic Pressure, Synchro, MS28010-5, Clamp-mounted, 2-in. size, 0 - 4000 psi, MIL-I-7084	61-1456	0.7

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* A/C Ser. No. AF53-1791 thru 53-1818 ** A/C Ser. No. AF54-1371 and on

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

INSTRUMENT (Weight Empty)(Cont)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
15	1	Transmitter - Rate-of-Flow, (Fuel), Style J-6, MIL-T-6598	61-2446	7.0
16	1	Indicator - Rate-of-Flow, (Fuel), Style A-19, MIL-I-6599	61-2447	0.5
17	1	Generator - Electric Tachometer, 2-Pole, Jet Engine, MIL-G-6027, AN5544-3	61-8710	1.9
18	1	Indicator - Turbine Outlet Temperature, Thermocouple, Single, 0 - 1000° C, MS28006-1, MIL-I-7076	61-8829	0.6

ELECTRICAL (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	1	Battery - Aircraft Storage, 24-volt, 24-amp-hr, Type AN3151-2.	42-350	56.0
◊2	1	Panel - Control, Generator, 28-volt, D.C. Type B-3, MCREXE-22-89B	42-730	10.8
◊3	1	Panel - Control, Generator, Universal A.C. Type G-1, WCEEE1-22	42-731	11.0
Ø4	1	Generator - A.C., 30 KVA, 120/208-volt, 3-Phase (Convair Spec 8-06371).		75.0
Ø5	1	Panel - Control, A.C., 115/200-volt, (Convair Spec 8-06371)		9.0
Ø6	1	Regulator - Voltage, A.C., 115/200-volt . . .		13.0
Ø7	1	Generator - D.C., 200-ampere, 30-volt (Convair Spec 8-06370)		48.0
Ø8	1	Panel - Control, D.C. (Convair Spec 8-06370) .		9.5

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◊ A/C Ser. No. AF53-1791 thru 53-1818 Ø A/C Ser. No. AF54-1371 and on

CONFIDENTIAL

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		ARMAMENT - ORDNANCE (Weight Empty)		
1	3	Initiator - With Cartridge, Type M-3.	93-316	2.4
2	2	Exactor - Type M-1	93-317	0.1
3	1	Initiator - With Cartridge, Type M-5	93-318	0.8
4	1	Catapult - Aircraft, Personnel, With Cartridge, Type M-3	93-320	24.7
5	1	Initiator - Delay, with Cartridge, Lap Belt Release, Type M-4 (T-13)	93-726	1.0
6	1	Thruster - With Cartridge, Type M-3	93-742	1.0
		ARMAMENT - (Design Useful Load)		
1	6	Launchers - Missile (Part of fire control system)		150.0
		FURNISHINGS AND EQUIPMENT (Weight Empty)		
☆☆1	1	Belt - Aircraft Safety, Lap, Automatic Opening, Type MA-1, 53J20940-1	45-1711	4.0
☆2	1	Belt - Aircraft Safety, Lap, Automatic Opening, Type MA-4	45-1717	4.0
$3	1	Harness - Shoulder, Aircraft Safety, Adjustable, Type MB-2	45-2442	1.1
@4	1	Harness - Shoulder, Aircraft Safety, Adjustable, Type MB-3	45-2443	1.1

☆☆ A/C Ser No. AF53-1791 thru 1802 ☆ A/C Ser No. AF53-1803 and on
§ A/C Ser No. AF53-1791 thru 1793 @ A/C Ser No. AF53-1794 and on

CONFIDENTIAL

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		ELECTRONICS (Weight Empty)		
		UHF Command Set AN/ARC-34		
1	1	Receiver-Transmitter, RT-263/ARC-34	81-8188	47.2
# 2	1	Mounting - MT-1099/U	81-4363	3.5
3	1	Control Panel - C-1057/ARC-34	81-2253	2.9
		Intercommunication Set AN/AIC-10		
1	1	Interphone Control - C-823/AIC-10, MCREE-867, 52C12814 and 2C684-823	81-2225	2.1
2	1	Dynamotor - DY-77/AIC-10, MCREE-867A, 52B12813, 3H-1535-77.	81-2910	4.3
# 3	1	Mounting - MT-1060/U, MCREE-867, 2Z763-1060	81-4343	1.0
		Marker Beacon Receiving Set AN/ARN-12		
1	1	Radio Receiver, R-122A/ARN-12 or R-122/ARN-12, 7082A, 2C4180-122	81-8154	7.2
# 2	1	Mounting - MT-589/ARN-12 or MT-589A/ARN-12, R7082A, 2Z6763-589.	81-4323 or 81-4381	1.2
		Radio Receiving Set AN/ARN-18		
1	1	Receiver - Radio - R-322/ARN-18, MIL-R-6201, 2C4180-322	81-8164	16.0

CONFIDENTIAL

A/C Ser No. AF53-1791 thru 53-1818

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

ELECTRONICS (Weight Empty)(Cont)

Radio Receiving Set AN/ARN-18 (Cont)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
# 2	1	Mounting - MT-691/ARN-18, MIL-R-6201A, 2Z6763-691	81-4330	2.7

Radio Receiving Set AN/ARN-14D

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	1	Receiver - Radio, R-541/ARN-14D or R-540/ ARN-14C, MCREE-329B	81-8162 or 81-8074	29.6
# 2	1	Mounting - MT-627A/ARN-14, 52D-12790, 2Z6763-627A	81-4327	3.3
3	1	Dynamotor - DY-84/ARN-14A, MCREE-329B . .	81-2911	8.7
# 4	1	Mounting - MT-962/ARN-14A.	81-4352	1.2
5	1	Indicator - Radio Control, ID-251/ARN, MIL-R-5821, 2C1565-251	81-3365	2.0
6	1	Control Panel - C-996/A, MIL-C-8174, S50D-2560, S51H-2514	81-2235	2.6
7	1	Indicator - Course, ID-351/ARN or ID-351A/ ARN or ID-387/ARN	81-3371 or 81-3386	3.7
8	1	Indicator - Course, ID-250/ARN or ID-250A/ ARN	81-3364 or 81-3374	2.5

Radar Identification Set AN/APX-6A

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	1	Receiver-Transmitter - RT-279 /APX	81-8195	44.5
2	1	Control Transponder Set - C-1158/APX, MIL-C-8327	81-2288	3.5

A/C Ser No. AF53-1791 thru 1818.

CONFIDENTIAL

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		ELECTRONICS (Weight Empty) (Cont)		
		Radar Identification Set AN/APX-6A (Cont)		
# 3	1	MTG Base - MT-362A/A.	81-4320	1.4
		ARMAMENT - GUNNERY (Weight Empty)		
* 1	1	Fire Control System - Fighter Interceptor, fixed MG-3 (not including nose racks and wiring). . .	52-4363	1169.8
** 2	1	Nose Racks and Wiring for MG-3 Fire Control. .		302.9

* A/C Ser No. AF53-1799 and on

** A/C Ser No. AF53-1799 thru 54-1373

# A/C Ser No. AF53-1791 thru 1818

CONFIDENTIAL

APPENDIX I-B

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - GOVERNMENT INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		ARMAMENT (Design Useful Load)		
1	24	Rocket - Aircraft, Folding Fin, 2.75" FFAR . .		432.0
2	6	Missiles - Air-to-Air, Hughes, GAR-1 and/or GAR-1B		801.0
		ARMAMENT - GUNNERY (Weight Empty)		
%1	1	Fire Control System - Fighter, Interceptor, Fixed MG-3 (including nose racks and wiring	52-4363	1472.7
		ELECTRONICS (Weight Empty)		
1	1	Coder - Transponder Set, KY-95/APX-25	81-1911	14.3
2	1	Control - Coder Group, C-1128/APX-25	81-2280	2.0
		MISCELLANEOUS (Useful Load)		
1	1	Personnel Parachute - Back-type (size 15 x 25 x 5 inches)		20.0
2	1	Survival Kit - Seat-type		18.0
		MISCELLANEOUS (Special Load)		
1	2gal	Anti-Icing Fluid - Radome		18.7

CONFIDENTIAL

% A/C Ser No. AF53-1791 thru 53-1798.

CONFIDENTIAL

APPENDIX I-B

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - GOVERNMENT INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		WEIGHT AND SPACE PROVISIONS ONLY (Weight Empty)		
1	1	Omni - DME - AN/ARN-21		47.0

CONFIDENTIAL

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Refer to Contractor's Bill of Materials, Equipment Section, for Part Numbers.

Item No.	Qty	Description
		LANDING GEAR (Weight Empty)
1	1	Shock Strut - Nose Landing Gear
2	1	Shock Strut - Main Landing Gear
3	1	Steer Damp Unit - Nose Gear
		POWER PLANT (Weight Empty)
1	2	Pump - Fuel Booster, Electric Motor-driven
2	1	Air/Oil Cooler
3	1	Probe - Ice Detector, Cook Electric
4	1	Interpretor - Ice Detector, Cook Electric
		PNEUMATIC (High Pressure) and HYDRAULIC SYSTEM (Weight Empty)
1	2	Pump - Hydraulic, Engine-driven, Variable Volume, Spec MIL-P-7740
2	1	Pump - Hydraulic, Air-driven
3	2	Accumulator - 3000 psi, Hydraulic
4	AR	Valves
5	AR	Cylinders
6	AR	Filters
7	AR	Pressure Switches
8	AR	Quick Disconnects
9	2	Flask - Air, 3000 psi
10	AR	Regulators
11	1	Motor - Hydraulic, Alternator Drive
12	2	Reservoirs

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description
		ELECTRICAL (Weight Empty)
1	2	Receptacle - External Power, 28-volt, D. C. with Shield
2	1	Receptacle - External Power, 115/200-volt Alternating Current, 3-Phase
3	1	Flasher - Position Light
4	2	Light Assembly - Tail Position, White
5	2	Light Assembly - Tail Position, Yellow
6	4	Light Assembly - Top and Bottom Fuselage
7	1	Taxi Light - 150-Watt, PAR 46
8	2	Light Assembly - Wing Tip (1 red and 1 green)
9	1	Control System - Cabin Temperature
10	1	Control System - NESA
11	2	Light - Landing, PAR 46-250 Watts
12	1	Intervalometer - Rocket Firing,(Convair Spec 8-06311)
13	1	Intervalometer - Missile Firing, (Convair Spec 8-06383)
# 14	1	Generator - 30-Volt, 200-Amp, D. C., (Convair Spec 8-06301)
# 15	1	Generator - A. C. 120/208-Volt, 3-Phase, 400-Cycle, 26-KVA, (Convair Spec 8-06301)
16	1	Generator and Control - A. C. 1000-VA, 115/200, 3-Phase, (Convair Spec 8-06313)
# 17	1	Regulator - A. C., 115/200-Volt,(Convair Spec 8-06301)
18	1	Actuator - Elevator Trim, (Convair Spec 8-04303)
19	1	Actuator - Aileron Feel and Trim, (Convair Spec 8-04303)
20	1	Actuator - Rudder Trim -(Convair Spec 8-04303)
		ELECTRONICS (Weight Empty)
1	1	Radome
2	1	Antenna - Marker Beacon
3	1	Antenna - Glide Path
4	1	Antenna Assembly - Fin - Tip - UHF, Omni Range, Air-to-Air IFF

A/C Ser No. AF53-1791 thru 1818

CONFIDENTIAL

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

ELECTRONICS (Weight Empty) (Cont)

Item No.	Qty	Description
5	2	Antenna - Ground-to-Air, IFF
6	1	Antenna - Data Link
Ø 7	1	Mounting - MT-1060/U
Ø 8	1	Mounting - MT-1099/U
Ø 9	1	Mounting - MT-362A/A
Ø10	1	Mounting - MT-691/ARN-18
Ø11	1	Mounting - MT-1161/ARN-14
Ø12	1	Mounting - MT-962/ARN-14A
Ø13	1	Mounting - MT-589/ARN-12 or MT-589A/ARN-12

FURNISHINGS AND EQUIPMENT (Weight Empty)

Item No.	Qty	Description
1	1	Ejection Seat Assembly
2	1	Ejection Seat Track
3	1	Hose - Anti-G Suit
4	1	Hose - Anti-G Suit
5	1	Connector Assembly - Anti-G Suit
6	1	Drogue Parachute
7	1	Holder - Card, Air Speed Correction
8	2	Holder - Card, Stand-by Compass and Radio Magnetic Indicator, AN5800-1
9	1	Card - Air Speed Calibration, Type AF21-E
10	2	Card - Stand-by Compass and Radio Magnetic Indicator, AN5823-1
11	1	Valve Assembly - Regulating Ejection Type, Anti-G, Type M-8
12	1	Canopy Air Spring
# 13	1	Control Stick-Single Grip

Ø A/C Ser No. AF54-1371 and on
A/C Ser No. AF53-1791 thru 53-1798 (for use prior to installation of MG-3 system)

CONFIDENTIAL

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

OXYGEN EQUIPMENT (Weight Empty)

Item No.	Qty	Description
1	1	Regulator - Oxygen for 1800 psi System
2	1	Cylinder Assembly - Oxygen and Self-Opening Valve (AN6025AX386 Cylinder and Kidde No. 800402 Valve)
3	1	Tubing - Oxygen Mask to Seat, Quick Disconnect
4	1	Tubing - Oxygen, Seat, Quick Disconnect to Regulator
5	1	Valve - Oxygen, Filler, Roylin Corp No. 3280, MIL-V-8620, Style A, with Dust Cap added

FIRE DETECTION (Weight Empty)

Item No.	Qty	Description
1	2	Panels
2	2	Sets Cables

PNEUMATIC (Low Pressure), AIR CONDITIONING and ANTI-ICING SYSTEMS (Weight Empty)

Item No.	Qty	Description
1	1	Heat Exchanger
2	AR	Valves
3	1	Air Turbine - Refrigeration Unit
4	1	Regulator - Cabin Pressure
5	1	Regulator - "Q" Intelligence System
6	1	Pressure Regulator and Shut-off, Anti-Icing
7	1	Safety Valve - Cabin Pressure

INSTRUMENTS (Weight Empty)

Item No.	Qty	Description
1	1	Fuel Quantity Gage

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

	Item No.	Qty	Description
			INSTRUMENTS (Weight Empty) (Cont)
	2	1	Voltmeter - A. C. 0--150 - volt
Ø	3	3	Indicator - Landing Gear Position, MIL-I-6839
#	4	1	Tube - Pitot, 24-volt, AN5816-2, MIL-T-5420A
	5	1	Angle of Attack Pick-Up
	6	1	Total Air Temperature Pick-Up
#	7	1	Indicator - Pressure Ratio-Turbo Jet
#	8	1	Indicator - Outside Air Temperature and Pick-Up
	9	1	Indicator - Afterburner Position
			ARMAMENT - GUNNERY (Weight Empty)
##	1	1	Nose Racks and Wiring for MG-3 Fire Control
			AUTOMATIC FLIGHT CONTROL SYSTEM (Weight Empty)
	1	1	Pitch and Yaw Damping System
	2	1	Pilot Assist System
	3	1	Pitch "G" Limiting System

Ø A/C Ser No. AF54-1371 and on
A/C Ser No. AF54-1374 and on

A/C Ser No. AF53-1791 thru 53-1818

APPENDIX I-D

SPECIAL EQUIPMENT - CONTRACTOR FURNISHED

Item No.	Qty	Description
1	2	Shield Assembly - Intake Duct
2	1	Shield Assembly - Exhaust Tailpipe
3	4	Lock Assembly - Lower Missile Bay Doors
4	1	Cover Assembly - Canopy and Radome
5	2	Plug Assembly - Boundary Layer Duct
6	4	Lock Assembly - Upper Missile Bay Doors
7	1	Lock Assembly - Speed Brakes
8	1	Cover Assembly - "Q" Intake
9	2	Eyebolt Assembly - Wing Mooring Pad
10	1	Lock Pin Assembly - Canopy and Seat
11	2	Pin - Down Lock, Main Landing Gear
12	1	Pin - Down Lock, Nose Landing Gear
13	1	Pin - Alignment, Nose Landing Gear Steering
14	2	Support Assembly - Radar Door Hold-Open

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUREMENTS

Deviation **Paragraph:** AMC Manual 80-1, Handbook of Instruction for Aircraft Designers, Ninth Edition, Including Revisions up to and Including 1 April 1950.

1 3.1.6 Dimensions and General Data:

Requirement: Paragraph 0.17 - Dimensions (maximum of aircraft parts) "For aircraft whose ferry range is less than 3,000 miles, the design shall be such that the aircraft may be readily disassembled and packed for shipment by rail and ocean-borne carrier. Since there are limitations in the size of container which can be transported by surface carrier, all components should be designed to fall within those limitations. The importance of providing suitable fastenings, bearing surfaces, etc., for use in shipment of components and spare parts should be recognized in their design. Whenever it is possible, without unduly compromising design, the disassembled parts of the aircraft shall be of suitable dimensions for packaging in containers of minimum excess cubage."

Deviation: Consideration need not be given in the design for disassembly of the airplane for shipment nor for limitation of dimensions expressly for this purpose.

Reason for Change and Remarks: In the interest of weight savings the airplane has not been designed to the packaging requirements.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
2	3.4	Structural Design Criteria

Requirement: Paragraph 3.1 - "The stress analysis criteria shall be as set forth in Specification No. C-1803. This document is classified Confidential "

Deviation: The structural criteria shall be as indicated in Contractor's Report No. ZU-8-023, "Stress Analysis Criteria for the F-102A Airplane", in lieu of AF Specification C-1803-3 and R-1803-1 through R-1803-10. The Contractor's report shall be subject to approval of WADC.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range and purpose of the aircraft.

* * * *

Deviation	Paragraph	
3	3.4	Structural Design Criteria

Requirement: Paragraph 4.102 - "Detailed measures required by the Air Materiel Command for avoiding flutter, together with the data to be submitted, are listed in Specification No. 1817. It will generally be found advantageous to construct the prototype aircraft using a conservative approach to flutter prevention such as complete compliance with the detail requirements of the specification."

Deviation: The requirements of Specification No. 1817 shall in general apply. The method of complying with this specification shall be outlined in Contractor's Report ZU-8-025 "Outline of F-102A Aeroelastic Investigations" which is subject to WADC approval.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
11	3.4	Structural Design Criteria

Requirement: Paragraph 5.441 - "The requirements for the static balance of control surfaces to prevent flutter are given in Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall in general apply. The method of complying with this specification shall be outlined in Contractor's Report No. ZU-8-025 "Outline of F-102A Aeroelastic Investigations" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
12	3.4	Structural Design Criteria

Requirement: Paragraph 5.442 - "The requirements for dynamic balance of control surfaces and the calculations involved in determining dynamic balance may be found in Chapter 4, Flutter, Vibration and Noise, and Specification No. 1817."

Deviation: The requirements of Specification No. 1817 shall in general apply. The method of complying with this specification shall be outlined in Contractor's Report No. ZU-8-025 "Outline of F-102A Aeroelastic Investigation" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
13	3.4	Structural Design Criteria

Requirement: Paragraph 6.120 - "Rigid structure shall be provided to support the crew members at all ditching stations for the load factors specified in Specification No. R-1803-5."

Deviation: Requirement not applicable.

Reason for Change and Remarks: Not applicable to this type of aircraft.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
14	3.7.1.3.6	Pilot's Windshield

Requirement: (a) Paragraph 6.21 - "Flat panels in those areas used for vision in taking off, flying, aiming guns, and landing should be placed at an angle of incidence no greater than 55 if Type I, Grade A glass, or plastic of equivalent optical properties, is used."

(b) Paragraph 6.213 - "The design of transparent sighting areas shall be such that the theoretical variation in sight line deviation around the avarage sight line deviation over the entire area shall not be greater than 0.5 mil."

(c) Paragraph 6.213 - "Scanning area is defined as that portion of a transparent installation used for vision during taxiing, take-off, flying, landing and scanning from aircraft. The theoretical sight line deviation through any portions of the area inside a one-inch border shall not be greater than 1 mil, at the maximum angle of incidence normally used in the aircraft.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   AMC Manual 80-1 (Cont)

14 (Cont)   Deviation:

(a) The true angle of incidence may be 75°.

(b) The sight line deviation may be 6 mil maximum.

(c) This requirement will be determined at a later date.

Reason for Change and Remarks: ( ) A flat windshield installed to HIAD requirements results in severe performance penalties at supersonic speeds. A sloping "V" windshield has been found to offer the best supersonic high speed performance.

(b) The sloping "V" windshield of the F-102 results in high incidence angles with resultant sight line deviations. (At 75 incidence the deviation through glass is approximately 7 times as great as at 0 incidence.) The "V" windshield also requires vision through the margins of the glass for gun sighting. With present glass lamination manufacturing procedures, deviation through the margins of the glass panels is approximately twice that obtained one inch from the edge.

(c) The optics of the canopy transparent panel are unknown as to this date.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviations Paragraph AMC Manual 80-1 (Cont)

15 3.7.1.3.6 Pilot's Canopy

Requirement: Paragraph 6.22 - "Specification AN-P-45 is to be complied with in the installation of transparent panels."

Deviation: Specification No. AN-P-45 is to be complied with, with the following exceptions:

(a) MIL-P-8184 shall be considered an applicable specification (AN-P-45, Paragraph B).

(b) Satisfactory stress levels of the transparent material will be established by static tests (AN-P-45, Paragraph D-3a).

Reason for Change and Remarks: (a) MIL-P-8184 is a later and superior material.

(b) AN-P-45 limits fibre stresses to 650 psi above 77 F. It is intended to demonstrate that the canopy is satisfactory by means of an Air Force approved test program rather than maintain the stress level below 650 psi. (Reference Convair letter 6-2746 dated 18 June 1946).

* * * *

16 3.19.1.1 Ejection Seat

Requirement: Paragraph 6.411 - "For upward ejection from the airplane, the seats shall be in accordance with Specification No. 25282."

Deviation: An ejection seat conforming to the Contractor's Specification No. 8-04322, as approved by WADC, shall be installed for the pilot.

Reason for Change and Remarks: To provide nonbottoming pilot's ejectable seat with improved arm rest ejection controls and 10° seat angle. Contractor's specification is in general accordance with Specification No. MIL-S-9479.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
17	3.7.1.3.1	Pilot's Compartment
	Requirement:	Paragraph 6.413 - Standard Cockpits - "In order to insure that all cockpits will be uniform and suitable as possible to pilots, the dimensions and locations of certain items shall be observed. These dimensions and location areas shown on Drawings AD1 through AD3, which will illustrate the requirements for the standard cockpit."
	Deviation:	Drawing AD1 shall be applicable regarding cockpit dimensions and locations except for: (a) The seat back angle shall be 10° in lieu of 17°. (b) The vertical distance from the seat reference point to the reference point of the throttle grip shall be 7.35" in lieu of 13.5". (c) The horizontal distance from the seat reference point to the neutral point of the stick grip shall be 20.72" in lieu of 19.0". (d) The vertical distance from the seat reference point to the neutral point of the stick grip shall be 12.00" in lieu of 13.5". (e) The seat adjustment shall be parallel to seat back in lieu of 1.5" forward in 'up' position and 1.5" aft in 'down' position.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
17 (Cont)	3.7.1.3.1	Pilot's Compartment (Cont)

(f) The horizontal distance from the seat reference point to the neutral rudder pedal location shall be 36.15" in lieu of 35.25".

(g) The cockpit depth shall be 40.0" in lieu of 39.5".

Reason for Change and Remarks: (a) The 10° seat back angle meets requirements of Specification No. MIL-S-9479 dated 3-19-54.

(b) To provide sufficient hand clearance between top of throttle control and cockpit longeron.

(c) To provide control stick clearance at seat and abdominal clearance at full aft stick travel.

(d) Control stick shortened two inches from original F-102 configuration as a result of flight evaluation and approved by the F-102A Mock-up Inspection.

(e) The seat adjustment conforms to Specification No. MIL-S-9479.

(f) Rudder pedal adjustment is increased to further compensate for seat adjustment method as required by Specification No. MIL-S-9479.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
17 (Cont)	3.7.1.3.1	Pilot's Compartment (Cont)

(g) To provide additional leg clearance beneath the instrument panel as required by RFA #105 and Item (J) under "Cockpit" of AMC ltr MCPPAF-5/RDF/lmh F-102.01, dated 12-1-52.

(h) To make specification agree with cockpit mock-up approved 28 July 1954.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
18	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.415 - (a) "All aircraft shall be equipped with instrument-flying inclosures that can be opened and closed in flight."

(b) "The inclosures for single-seat aircraft shall be equipped with an automatic release."

(c) "Instrument-flying inclosures are, in general, of two types; the hood type..., and the two-color combination view-limiter type. The first type will be habitually used on aircraft with single or tandem cockpits."

Deviation: (a) The instrument-flying inclosure will not be of a type which permits opening and closing in flight.

(b) An automatic release shall not be required.

(c) The instrument-flying inclosure shall be the two-color combination view-limiter type.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
18 (Cont)	3.7.1.3.1	Pilot's Compartment (Cont)

Reason for Change and Remarks: (a) The configuration of the cockpit and pilot's windshield precludes the possibility of the instrument-flying inclosure being readily opened and closed in flight and of providing an automatic release.

(b) An automatic release is not required for single-seat aircraft using two-color combination view-limiter type inclosure.

(c) WADC has indicated their desire to use the two-color combination view-limiter type flying inclosure on this aircraft.

* * * *

19	3.16.8.2	Interior Lighting

Requirement: Paragraph 6.416 - Lighting - "Instruments in fighter aircraft shall be lighted by ultra violet excitation."

Deviation: Instruments shall be lighted in accordance with Specification No. MIL-L-6423A, except as specific herein.

Reason for Change and Remarks: To conform to later requirements of AMC Manual 80-1.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
20	3.8.3	Auxiliary Landing Gear

Requirement: Paragraph 7.10 - "Any aircraft equipped with a tri-cycle gear shall be provided with a tail skid or buffer ..."

Deviation: A tail skid or buffer shall not be required.

Reason for Change and Remarks: To save weight plus experience with the YF-102 airplane indicates that a tail skid or buffer is not necessary.

* * * *

21	3.8	Alighting Gear

Requirement: Paragraph 7.60 - "Air loads existing at 150% of sea level stalling speed with flaps shall appear to act on the landing gear installation.

Deviation: Air loads existing at 270 knots, 242% of the speed attainable with $C_L = 0.75$ and airplane weight 22,071 pounds, shall appear to act on the landing gear installation.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary. In addition, this airplane is not equipped with flaps.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

22 3.8 Alighting Gear

Requirement: Paragraph 7.60 - "It shall be possible to operate the landing gear at all speeds up to 175 percent of the stalling speed."

Deviation: It shall be possible to operate the landing gear at all speeds up to 270 knots, 242 percent of the speed attainable with $C_L = 0.75$ and airplane weight 22,071 pounds.

Reason for Change and Remarks: Due to the flying characteristics of this airplane, it is necessary to design the alighting gear to operate at higher speeds than 175% of stalling speed. Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

* * * *

23 3.8 Alighting Gear

Requirements: Landing Gear Retracting Mechanism
Paragraph 7.611 Landing gear controls "Controls shall conform to Chapter 9 Controls" Paragraph 9.5 wing flap and landing gear controls. "Wing flaps and landing gear actuating systems shall conform to Chapter 10, Actuating Systems" refer to 10.4 Mechanical Systems. Paragraph 10.400 Bearings: "All moving joints between push-pull rods, levers and brackets shall have anti-friction bearings in accordance with 8.31 Anti-Friction bearings."

Deviation: Plain bearing with adequate lubrication facilities, where practical, and consistent with acceptable alighting gear practice may beused, providing satisfactory information is submitted to and approved by WADC substantiating their use.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

23 (Cont) 3.8 Alighting Gear (Cont)

Reason for Change and Remarks: Anti-Friction bearings would impose impracticable installation problems and excessive weight due to the large design loads and limited space.

* * * *

24 3.16.11.2 Signal Assemblies

Requirement: Paragraph 7.611a - "The landing gear indicating system shall be in accordance with Specification No. 32300.

Deviation: The landing gear indicating system shall be installed in accordance with Specification No. MIL-E-7563 as deviated in this appendix.

Reason for Change and Remarks: To specify applicable specification.

* * * *

25 3.8.2.5 Retracting, Extending and Locking Systems

Requirement: Paragraph 7.611k - "Leakproof sealed units, using AF approved low travel switches (reference Specification MIL-S-6743), shall be installed on the main landing gear in such a manner that the initial compression motion of the shock absorber actuates the switch. The purpose of these switches is to prevent retraction of the landing gear while the airplane is on the ground. They shall be wired in series with each other and shall be capable of being adjusted to operate at 1/2 inch plus 1/4 inch minus 0 inch from the shock strut fully extended position. These shall serve to operate a continuous duty type solenoid for unlocking the landing gear control lever."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

25 (Cont) 3.8.2.5 Retracting, Extending and Locking Systems (Cont)

Deviation: A safety switch shall be required on the left hand main landing gear shock strut only.

Reason for Change and Remarks: The Contractor's experience has shown that two switches in series decrease the overall circuit reliability as well as increase weight, circuit complication and maintenance access problems. Practicability of a switch on the left main gear is borne out by flight tests to date.

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26 3.8.2.6 Main Landing Gear Doors and Fairings

3.8.4.6 Nose Landing Gear Doors and Fairings

Requirement: Paragraph 7.701a - "Landing gear doors shall be designed to close when the landing gear is in the fully extended position."

Deviation: The landing gear doors need not be designed to close when the landing gear is in the fully extended position.

Reason for Change and Remarks: The above requirement is basically for aircraft with low thrust to reduce drag during take-off. Also, due to the increase in weight and the complexity in design, it is not deemed advisable to comply with the above requirement. This is in agreement with the airplane as mocked-up and inspected by the Mock-up Board.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
27	3.2.11	Standard Parts

Requirement: Paragraph 8.101 - Threads. "Threaded holes in fitting shall be avoided due to high original cost and the limited serviceability of the fittings. The attachment of fittings to the aircraft structure shall not involve the use of extensive threaded surfaces."

Deviation: Where threaded holes in fittings, structure, or bosses cannot be avoided, the part shall be designed to permit machining and threading for the next larger size standard screw thread, or shall employ removable externally threaded inserts, for the purpose of replacing the working threads.

Reason for Change and Remarks: To reflect later USAF policies as evidenced in July 1951 revision of HIAD.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
28	3.2.11	Standard Parts

Requirement: Paragraph 8.20 - Rivets. "All rivets must conform to those shown in the Army Air Forces Standards Book."

Deviation: (1) All rivets must conform to those shown in the USAF Standards book and ANA Bulletin 147.

(2) Corrosion-resistant steel rivets conforming to Contractor's Standards Q-4304 and Q-4310 may be used.

(3) DuPont Blast Free rivets including those with shaved heads may be used subject to the provisions of AMC Letter MCPPAF-6 (WCSF-6) of 4 Dec 1953, and MCPPAF-6 (WCSF-6) of 24 July 1954.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
28 (Cont)	3.2.11	Standard Parts (Cont) (4) Huck Lockbolts may be used subject to the provisions of AMC Letters to Huck Manufacturing Co., MCREXA71 of 22 Nov. 1949, MCREXA71 of 14 Jan. 1949, MCREXA71 of 26 Mar. 1948, and TSEAC 11B of 1 July 1947. (5) Series 200 and 260 Jo Bolts may be used subject to the Provisions and limitations of WADC Letter WCLSJ-3 of 18 Aug. 1954 to National Screw and Manufacturing Co. of California. (6) Contractor's Q-4326 rivets installed per Contractor's standard Q-2008 with Q-7106 washers may be used in construction of integral fuel tanks.

Reason for Change and Remarks: (1) To add more recent standard fastenings now recognized by USAF.

(2) These Contractor standards have been approved by AMC Letter.

(3) Blind Fasteners are necessary and DuPont Blast Free rivets require less back clearance and prevent corrosion from products of explosion.

(4) To provide a high strength fastener with adequate clamp-up, to avoid the weight penalty of screw and nut combinations in permanent joints, and to provide tighter fits.

(5) To provide a high strength blind fastener and to avoid the weight penalty of screw and nut plate combinations in permanent joints.

(6) These rivets are required for fabricating of integral fuel tanks in accordance with Contractor's Report #8-00010 submitted to WADC and approved.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
29	3.2.11	Standard Parts

Requirement: Paragraph 8.21 - Bolts. "An standard bolts and screws shall be used in the primary structure of the aircraft."

Deviation: (a) An Standard bolts and screws and the standard bolts and screws listed in ANA Bulletin 147 shall be used in the primary structure of the aircraft. In addition the MS 20,004 series bolts may be used.

(b) Corrosion resistant screws may be used.

(c) "Nylock" self locking bolts and screws may be used subject to the provisions of WADC Letter to the Nylock Corp. WCLSJ-3 of 18 March 1954.

Reason for Change And Remarks: (a) To add later more convenient fasteners recognized by industry and the services.

(b) Corrosion-resistant screws are for use in the vicinity of compass installations where nonmagnetic materials are required.

(c) NYLOCK screws to be used in order to keep windshield post sizes to a minimum in order to keep within Mock-Up requirements, Ref. Convair Letter 6-3137 dated 16 July 1953 and AMC Letter MCPPAF-6 (WCOWF-6) dated Aug. 18, 1953.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
30	3.2.11	Standard Parts

Requirement: Paragraph 8.21 - Bolts. "Bolts loaded in shear and subject to reversals of load shall be installed to close tolerance holes with no perceptible play."

Deviation: Shear bolts in pin-jointed structures subject to reversals of load shall be installed in close tolerance holes with no perceptible play. The term "no perceptible play" is interpreted as the actual hole diameter not exceeding the nominal bolt or pin diameter by more than 0.0015 inch for bolts or pins of 1.000 inch diameter or less, and by more than 0.0020 inch for bolts or pins with diameters larger than 1.000 inch up to and including 1.625 inch.

Reason for Change and Remarks: To define the requirements stated above in accordance with the Contractor's practice.

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31	3.2.11	Standard Parts

Requirement: Paragraph 8.22 - Nuts. "All nuts used in aircraft structures which may require removal shall be either castellated nuts conforming to Specification No. MIL-N-6034, to be locked with cotter pins, or self-locking nuts conforming to Specification No. AN-N-5 or AN-N-10.

Deviation: Applicable, except that nuts for NAS series bolts may be used, and except that nuts for corrosion and heat-resistant screws may be used.

Reason for Change and Remarks: To permit use of nuts corresponding to nonstandard bolts and screws authorized.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
32	3.2.11	Standard Parts

Requirement: Paragraph 8.221 - Self-Locking Nuts - Self-locking nuts and plate nuts shall be of an approved type, selected from those listed in ANA Bulletin 159.

Deviation: Elastic Stop Nut Corporation, Flush, 100°, Slotted Nut No. 52-1650-02 may be used.

Reason for Change and Remarks: To permit the removal of thin structural parts such as Fin Tip sections for repairs and maintenance.

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33	3.2.11	Standard Parts

Requirement: Paragraph 8.24 - (1) "Taper pins shall be used in all permanent connections seldom broken and where absence of play is essential." (2) "Cylinder pins may be used ... They shall be safetied by peening the ends into shallow countersunk recesses."

Deviation: (1) The use of Springpins shall be permitted providing they are installed in accordance with Specification MIL-P-10971 (ORD.), and MS 33547 (ASG).

(2) When cylindrical pins are used safetying may be by staking.

Reason for Change and Remarks: (1) Springpins are lighter in weight and are easier to remove when necessary to do so. Also, the use of rollpins simplifies fabrication. (2) Contractor prefers the staking safetying method since it is more practical both time and cost-wise and is a method used universally.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

34 3.2.11.1 Bearings

Requirement: Paragraph 8.31 - "Control surface hinges and all moving joints between push-pull rods, levers, and brackets shall have anti-friction bearings in accordance with Specification AN-B-4 and Air Force-Navy Aeronautical Standard AN200, AN201, AN206 and AN207."

Deviation: (1) Applicable except that spherical self-aligning bearings may be used for actuating cylinder pivots. Relubrication shall be provided where practicable. Each specific application shall be submitted to WADC for approval.

(2) Shafer - Self aligning - Double row - positive seal Series "A" bearings may be used in Elevon and Rudder hinges. Each specific application shall be submitted to WADC for approval.

(3) Fafnir - Self aligning - Sealed ball bearing - Series KP-49-BS may be used on lower rudder hinge. Self aligning portion shall be used for assembly misalignment only.

(4) Plain bearings with adequate lubrication facilities, where practical and consistent with acceptable alighting gear practice may be used. Each specific application shall be submitted to WADC for approval.

(5) Fafnir bearings of the DW series may be used in the primary controls.

(6) Fafnir rod ends of the RE series may be used on push-pull rods in the primary and secondary controls.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

34 (Cont) 3.2.11.1 Bearings (Cont)

Reason for Change and Remarks: (1) Anti-friction bearings would impose impracticable installation problems and excessive weight due to the required large design loads.

(2) Space limitations require these bearings and reflect appreciable weight savings.

(3) No AN Bearings of this size, type and capacity available.

(4) Anti-Friction bearings would impose impracticable installations problems and excessive weight due to the required large design loads.

(5) To simplify design, reduce control system play and save weight.

(6) To reduce control system play.

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35 3.2.11.1 Bearings

Requirements: Paragraph 8.312 - "The static limit loads for anti-friction bearings shall not exceed the minimum non-Brinnell loads given in Specification AN-B-4."

Deviation: The following shall be the bearing limit load ratings:

Bearings	Limit Load Ratings
AN 200KP Series	8,000ND^2
AN 201KP Series	8,000ND^2
AN 202KP Series	8,000ND^2
AN 200KS Series	4,000ND^2
AN 206DSP Series	3,000ND^2
Ball Bearing Rod Ends	3,000ND^2
N - Number of Balls	D - dia of balls

Reason for Change and Remarks: The above loads are those approved by WADC Ltr WCSWF 1/WCS/HLM dated 18 Aug. 1952.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
36	3.20.1.2	Ground Air Conditioning

Requirement: Paragraph 8.412 - "An opening in the engine cowling for ground heaters will be provided for, by either an accessory door with minimum dimensions of 12 inches diameter or an easily removable section of cowling of equivalent size."

Deviation: No engine cowling is required. However, provision shall be made for ground heating of the accessory compartment.

Reason for Change and Remarks: Engine cowling is not applicable to this type of power plant installation. Means will be provided for obtaining ground heat for engine accessories.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
37	3.4	Structural Design Criteria

Requirement: Paragraph 8.42 - "Cowling and its supporting structures shall be designed to the strength requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-023 "Stress Analysis Criteria For The F-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

38 3.2.11 Standard Parts

Requirement: Paragraph 3.440 Quick Acting Fasteners - Cowling fasteners used on the external surfaces of Aircraft in attaching cowling, inspection doors, etc., shall be flush with the surface, with the fasteners in the locked position, and shall conform to Specification AN-F-8. They shall be selected from the approved fasteners covered by ANA Bulletin 248 and Standard Sheet AND 10076.

Deviation: It shall be permissible to use shear type camloc fasteners.

Reason for Change and Remarks: To provide quick removal of access doors, to permit carrying normal fuselage shear with a minimum of space and weight being utilized. (Approval obtained in AMC Ltr dated 24 December 1953)

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39 3.22.4 Hoisting

Requirement: Paragraph 3.511 - Hoisting. - "Hoisting slings shall be provided and carried as special equipment."

Deviation: Provision for carrying hoisting slings in the airplane is not required.

Reason for Change and Remarks: Insufficient space in the airplane available for stowage.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
40	3.20.1.2	Ground Air Conditioning

Requirement: Paragraph 8.52 - Ground Handling. "....provisions will be made in the aircraft fuselage at applicable stations requiring ground heating for attaching of AF standard 12-inch ground heater ducts."

Deviation: Provisions for attachment of the specified ground heater ducts is not required.

Reason for Change and Remarks: Provision shall be made for obtaining ground heat for the cockpit as described in this model specification.

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Deviation	Paragraph	
41	3.4	Structural Design Criteria

Requirement: Paragraph 8.520 - "The alighting gear and its supporting structure shall be designed to the towing requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-023 "Stress Analysis Criteria For the F-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

42 3.4 Structural Design Criteria

Requirement: Paragraph 8.521 - "The mooring fittings and the structure to which they are attached shall be designed in accordance with Specification No. C-1803 ...."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-023 "Stress Analysis Criteria For the F-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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43 3.22.3 Mooring Provisions

Requirement: Paragraph 8.521a - (1) "A mooring fitting shall be provided on the fuselage of each aircraft near the tail."

(2) "For aircraft of 16,000 pounds design gross weight or less, mooring fittings attached to the wing, one on each side of the plane of symmetry and as near as practicable to the middle of the semispan, shall be provided. For larger aircraft, two wing mooring points on each side of the plane of symmetry shall be provided."

Deviation: (1) Mooring fitting on the fuselage tail shall not be required.

(2) One wing mooring point on each side of the plane of symmetry shall be provided.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

43 (Cont) 3.22.3 Mooring Provisions (Cont)

Reason for Change and Remarks: (1) Due to Delta wing configuration, aft mooring provisions are incorporated in the outboard end of wing.

(2) Due to the short wing span it is not practical to provide two mooring points on each side.

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44 3.22.5 Leveling:

Requirement: Paragraph 8.531 (Leveling Provisions) - "Each aircraft shall be furnished with provisions for obtaining the true level attitude of the longitudinal and lateral axes of the aircraft while the aircraft is being weighed, while structural alignment is being made, or while armament is being adjusted and aligned. Provisions for plumb bobs, which permit a free fall of 36 inches, are desired; however, if brackets are used they shall be 18 to 20 inches apart, shall be located on the left side of the fuselage, and should be forward of the wing. All jig points and leveling provisions shall be suitably marked or labeled in accordance with Specification AN-M-18."

Deviation: (a) Lateral leveling brackets shall be located symmetrically about center line of airplane.

(b) Longitudinal leveling brackets shall be located in the aft right hand missile bay.

(c) Leveling brackets shall not be located forward of the wing.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
44 (Cont)	3.22.5	Leveling (Cont)

(d) Leveling provisions shall be installed in accordance with Specification No. MIL-M-6756.

(e) Lateral leveling brackets shall be spaced 14 inches apart. Longitudinal leveling brackets shall be 21 inches apart.

Reason for Change and Remarks: (a) and (b) Due to structural and equipment density, it is impractical to locate brackets on left side of airplane.

(c) The delta wing configuration renders it impractical to comply. Leveling provisions shall be forward of the main landing gear.

(d) To establish use of later specification which supersedes AN-M-18.

(e) Spacing chosen permits mounting on existing structure. Conforming to requirement of 18 to 20 inches apart would require additional bracketry with resultant weight increase.

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45 3.7.1.2 Construction - Fuselage

Requirement: Paragraph 8.62 - ".... if hinged doors are used, the hinges shall be located so that the air stream tends to keep them closed, ..."

Deviation: It shall be permissible to provide access doors hinged at the top along a straight line section with fasteners provided to secure in a closed position and provided specific application approval is obtained from WADC.

CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

45 (Cont) 3.7.1.2 Construction - Fuselage (Cont)

Reason for Change and Remarks: Installation of access doors hinged at top precludes the necessity of additional structure to provide for hinge support on the fore side of the door. This permits weight savings. (Ref. CVAC Ltr 6-1113 of 12 March 1953, AMC MCPPAF-6/RGA/fob dated 10 May 1954.

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46 3.2.2 Materials: Magnesium castings.

Requirement: Paragraph 8.640 - "In the design of magnesium alloy castings, wall thickness shall not be less than 5/32 inch, and generous fillets shall be provided at junctures of all sections."

Deviation: Wall thickness of magnesium alloy sand castings may be of 1/8 inch thickness (minimum), subject to WADC approval of each application.

Reason for Change and Remarks: The structural strength of the 1/8 inch thick magnesium alloy sand casting is considered adequate and will result in considerable weight savings.

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47 3.4 Structural Design Criteria

Requirement: Paragraph 8.83 - "For design strength and rigidity requirements see AAF Specification No. C-1803."

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | AMC Manual 80-1 (Cont)

47 (Cont) | 3.4 | Structural Design Criteria (Cont)

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-023 "Stress Analysis Criteria For the F-102A Airplane" which is subject to NADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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48 | 3.8.2.5 | Retracting, Extending and Locking Systems

Requirement: Paragraph 9.14 - "Emergency" controls shall be properly located and safe-guarded to preclude inadvertant operation.

Deviation: Emergency landing gear control shall not be equipped with a guard.

Reason for Change and Remarks: Decision of Mock-Up Board of 28-29 July 1954. Ref. RFA #39.

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49 | 3.10 | Surface Control System

Requirement: Paragraph 9.22 - "Whenever push-pull tube systems are used in flight controls, they shall be arranged that all the tubes are in tension for the greater load for which the system is designed."

Deviation: The greater load may be in compression in some cases.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
49 (Cont)	3.10	Surface Control System (Cont)

Reason for Change and Remarks: Space available makes it undesirable to complicate the design to meet the above requirement in all cases. (Request submitted by CVAC Ltr 6-5877 dated 30 November 1953, approved by AMC Ltr MCPPAF-6 (WCSF-6) dated 25 January 1954).

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50	3.10.1	Primary Flight Control System

Requirement: Paragraph 9.305 - "The locking device shall provide for selective locking of the aileron, elevator and rudder controls and it shall also incorporate the feature of simultaneous locking of all controls at the will of the pilot."

Deviation: The above requirement shall not be applicable.

Reason for Change and Remarks: The above requirements have been deleted by later revisions to AMC Manual 80-1. To comply would unnecessarily complicate the control system and add weight.

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51	3.4	Structural Design Criteria

Requirement: Paragraph 9.307 - "The design of the control system, and its structural supports shall be based on rigidity and the elimination of deflection, as well as upon the ultimate strength requirements of Specification No. C-1803."

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

51 (Cont) 3.4 Structural Design Criteria (Cont)

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2 shall be as outlined in Contractor's Report No. ZU-8-023 "Stress Analysis Criteria for the F-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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52 3.10.1 Primary Flight Control System

Requirement: Paragraph 9.308 - "All cables shall be separated by at least 3 inches, preferably more."

Deviation: Cable spacing may be closer than 3 inches where necessary. Each particular case shall be submitted to WADC for approval.

Reason for Change and Remarks: Maximum cable spacing will be provided; however, in some cases it is impracticable to maintain three-inch spacing due to limited space available. (Approved by AMC Ltr MCPPAF-6 (WCSF-6) RGA/feb, dated 29 June 1954).

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

53 3.10.1 Primary Flight Control System

Requirement: Paragraph 9.31 - "Duplicate Controls". This paragraph under certain conditions, requires duplicate control system.

Deviation: A single cable control system shall be provided for each of the primary control systems.

Reason For Change and Remarks: The Delta wing configuration requires a control system mixer, which does not lend itself to a practical dual system. Dual cable systems will unduly increase the control system friction forces and weight.

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54 3.10.1.1 Flight Station Controls

Requirement: Paragraph 9.324 - "The aircraft structure, auxiliary controls, furnishing, instruments, etc., shall clear by at least 1-1/2 inches the cockpit primary air control items in all positions ...."

Deviation: A minimum clearance of 1-1/2 inches shall be maintained between the control stick grip and aircraft structure, however, the minimum clearance between other control components and aircraft structure may be less than 1-1/2 inches.

Reason for Change and Remarks: Maximum clearance will be provided; however, in some cases it may be impractical to maintain the full clearance specified in the HIAD.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

55 3.14.1 Instruments

Requirement: Paragraph 9.403 - "Tab position indicators shall plainly indentify by day or night the main control surface affected by the trim control ...."

Deviation: Tab position indicators shall not be required. A single light shall be installed to indicate when surfaces are in neutral (take-off) position. This light shall come on when all of the surfaces are trimmed neutral by the auto-trim switch.

Reason for Change and Remarks: USAF request at cockpit conference. The pilot needs only to know trim position prior to take-off.

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56 3.8.2.5 Retracting Extending and Locking System (Main Landing Gear)

Requirement: Paragraph 9.521 - "The landing gear control lever shall be installed with a solenoid released locking device which functions to preclude motion of the control lever from neutral to the "up" position when on the ground."

"For hydraulic or pneumatic retracting systems where the landing gear lever operates selector valves electrically by means of a conventional control circuit, a separate "contact" (multipole-pole switch) will be closed for each selector valve energized."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
56 (Cont)	3.8.2.5	Retracting Extending and Locking System (Cont)

Deviation: (1) A solenoid released locking device shall not be required.

(2) A separate "contact" (multi-pole switch) for each selector valve energized shall not be required.

Reason for Change and Remarks: (1) The safety switch on the main gear prevents the gear from being retracted when on the ground even though the landing gear control switch is moved to the "up" position.

(2) The landing gear control switch shall be in accordance with Contractor's Specification Control Drawing 8-06309 which has been submitted to AMC for approval.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
57	3.12.11	Propulsion System Controls

Requirement: Paragraph 9.604 - "In single-engine aircraft, at least 6 inches clearance shall be provided between the handle of the throttle lever or power lever and the handle of the control located nearest to it."

Deviation: The power control lever clearance may be reduced from the HIAD requirement.

Reason for Change and Remarks: The ejection seat clearance, landing gear lever, oxygen panel location prevents adherence to this specification.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC MANUAL 80-1 (Cont)
58	3.12.11	Propulsion System Controls

Requirement: Paragraph 9.621 - "All turbo-jet aircraft shall be provided.... and having a functional characteristic substantially in accordance with Figure 9.1.

Deviation: Thrust augmentation is in the regime between a point just forward of idle to maximum thrust.

Reason for Change and Remarks: The deviation, as stated, is a requirement of the engine performance for this airplane.

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59	3.16.4	Equipment Installation
	3.16.5	Wiring
	3.16.6	Bonding
	3.16.8	Lighting

Requirement: Paragraph 10.1 - Electrical System - "This paragraph and subsequent subparagraphs specify Specification Nos. AN-E-17, 32300, 94,32265, AN-W-14 and AN-B-10 as the applicable specification."

Deviation: Specifications MIL-E-7080, MIL-E-7563, MIL-L-6503 (USAF), MIL-W-5088 and MIL-B-5087 respectively, shall apply.

Reason for Change and Remarks: To specify applicable specifications.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

60 3.15.2 Pneumatic System

Requirement: Paragraph 10-303 - "Assume air bottle pressure to be 1800 psi. All air bottles used for emergency operation of hydraulic of pneumatic systems shall be selected for an initial air charge of 1800 psi. (Pressure lower than this results in the use of larger sized bottle and higher pressure is not available in service.)"

Deviation: Compressed air bottle pressure may be 3000 psi.

Reason for Change and Remarks: To agree with design storage pressure of the pneumatic system.

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61 3.2.11.1 - - - -

Requirement: Paragraph 10.400 - Bearings - All moving joints between push-pull rods, levers, and brackets shall have anti-friction bearings in accordance with 8.31, Anti-Friction Bearings.

Deviation: All moving joints between push-pull rods, levers, and brackets shall have anti-friction bearings in accordance with Specification AN-B-4 and Air Force, Navy Aeronautical Standard AN 200, AN 201, AN 202, AN 206, and AN 207 except that:

(1) Spherical self aligning bearings may be used in applications where specific application approval is obtained.

Reason for Change and Remarks: Anti-friction bearings would impose impracticable installation problems and excessive weight due to the required design loads.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
62	3.10.1	Primary Flight Control System

Requirement: Paragraph 10.410 - "Control Cables shall conform to Specification No. AN-C-43 or AN-C-48."

Deviation: Hy-Co-Span may be used in lieu of cables conforming to Specification No. AN-C-43 or AN-C-48.

Reason for Change and Remarks: The use of Hy-Co-Span simplifies the system by elimination of tension regulators and reduces weight. (Approved by AMC Ltr of 9 April 1954.)

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
63	3.10	Control Systems

Requirement: Paragraph 10.412 - "Fairleads shall be used wherever neccessary to keep cables from chafing and slapping against parts of the aircraft in flight or in taxiing .... They shall be of non-hygroscopic, nonabrasive material, and split to permit easy removal."

Deviation: It shall be permissible to use fixed fairleads with holes sufficiently large to permit withdrawal of cables.

Reason for Change and Remarks: To reduce friction. (Request submitted by Convair Ltr 6-5877 dated 30 November 1953, approved by AMC Ltr MCPPAF-6 (WCSF-6) RGA/met 25 January 1954).

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
64	3.2.11.1	Bearings

Requirement: Paragraph 10.421 - "Ball and socket joints shall not be used in control systems."

Deviation: Spherical self-aligning bearings may be used for actuating cylinder pivots.

Reason for Change and Remarks: Anti-friction bearings would impose excessive installation problems and weight increases due to the required large loads.

* * * *

65	3.19.4	Emergency System

Requirement: Paragraph 11.22 - An overheat detector system shall be installed in all turbo-jet .... in accordance with Specification 41409.

Deviation: The overheat detector system shall be as specified by the Procuring Agency.

Reason for Change and Remarks: The Edison continuous detector is used on this airplane to detect overheat in the aft engine compartment.

* * * *

66	3.19.2.4	Windshield Cleaners

Requirement: Paragraph 11.31 Transparent Surfaces, Windshield wipers, external anti-icing sprays and heated air de-icing, defrosting and defogging systems for maintaining vision through the transparent areas which are neccessary to the performance of the mission shall conform to Specification 40435.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | AMC Manual 80-1 (Cont)

66 | 3.19.2.4 | Windshield Cleaners (Cont)

Deviation: Means for maintaining forward vision during rain may be other than by windshield wipers.

Reason for Change and Remarks: Means for maintaining forward vision during rain shall be installed, however, this may be accomplished by a method other than wipers as covered by Specification MIL-T-5842.

* * * *

67 | 3.20.1.1.1 | Air Conditioning - Pressurization

Requirements: Paragraph 12.22 Safety Limits of Pressurization and Figures 12-2 and 12-3.

Deviation: Maximum rate of expansion limits as specified in Paragraph 12.22 and Figures 12-2 and 12-3 are not applicable for pilot emergency escape from the aircraft.

Reason for Change and Remarks: To keep the R.G.E. within the specified limits, a time delay of approximately two (2) seconds would be required to shut off the cabin air supply and dump the cabin pressure down to a safe level before opening canopy. This time delay is excessive for an emergency escape.

* * * *

68 | 3.20.1 | Air Conditioning

Requirement: Paragraph 12.30 - "..... provision shall be made for selecting automatic maintenance of a lower pressure differential during combat flight in accordance with requirements of paragraph 12.22, Safety Limits of Pressurization.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
68 (Cont)	3.20.1	Air Conditioning (Cont)

Deviation: A lower pressure differential during combat flight is not provided.

Reason for Change and Remarks: The intent of this requirement is met by pressure suit provisions.

* * *

69	3.20.1	Air Conditioning:

Requirement: Paragraph 12.341 - "Closing of the shut-off valves shall actuate simultaneously the ram air-inflow valve mechanism so as to insure continued cabin ventilation when the pressure source is not used.

Deviation: It shall not be required that the closing of the shut-off valve simultaneously actuate the ram air-inflow valve mechanism.

Reason for Change and Remarks: Simultaneous actuation of the ram air-inflow valve mechanism with operation of the emergency shut-off valve would dump the cockpit pressure with attendant adverse physiological consequences at high altitudes.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

70 3.20.1 Air Conditioning

Requirement: Paragraph 12. 342 1 "A valve in the ram air line shall be mechanically or electrically linked with both the emergency pressurized air shut-off valve described in 12. 341, Emergency Shut-off Valve, and the cabin air dump valve described in 12. 360, General. The linkage shall provide for positive actuation of the three valves when operating personnel desire to actuate any one of the three."

Deviation: A valve in the main air line shall be electrically linked with the cabin air dump valve and the emergency shut-off valve. Actuation of the cabin air switch to "RAM" actuates all three valves.

Reason for Change and Remarks: Actuation of cabin air switch to "OFF" position closes emergency shut-off valve, but does not open dump valve or ram air valve, thus holding cabin air pressure which is in conformance with deviation requested, for paragraph 12. 341 of (HIAD).

* * * *

71 3.20.1 Air Conditioning

Requirement: Paragraph 12. 345 - "Water Separator and Drain"

Deviation: Water separator and drain are not required.

Reason for Change and Remarks: Provision for water separator is deemed inadvisable because of the extremely short duration of sea level flight in the normal tactical application of the airplane. Such provisions impose penalties in weight and space of the low pressure pneumatic system.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
72	3.20.1.1.1	Air Conditioning

Requirement: Paragraph 12.350 - General - The cabin pressure to be maintained at various flight altitudes shall be as shown in Figure 12-4 for aircraft having one or two crew members, "etc."

Deviation: The cabin pressure schedule will be as per Paragraph 3.20.1.1.1.

Reason for Change and Remarks: This pressure schedule provides more adequate cockpit pressures for pilot environment, at altitude.

* * * *

73	3.20.1	Air Conditioning

Requirement: Paragraph 12.351 - "Control of Rate of Pressure Change."

Deviation: Control of rate of pressure change need not be provided.

Reason for Change and Remarks: In conformance with paragraph 12.350 for aircraft with one crew member and a service ceiling over 50,000 feet altitude, there will be one schedule of cabin pressure only. Therefore, the necessity for switching from normal to combat is removed.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

74 3.20.1 Air Conditioning

Requirement: Paragraph 12.372 - Cabin Air Inflow and Mixing Flow Package for Jet-Propelled Aircraft. The cabin flow and mixing valve package shall comprise a dual valve arrangement . ...

Deviation: Considered not applicable per reason noted.

Reason for Change and Remarks: The single butterfly refrigeration unit by-pass valve performs the intent of the above requirement.

* * * *

75 3.20.1 Air Conditioning

Requirement: Paragraph 12.376 Referring to Specification R-40659-A "Heating, Aircraft Cabin General Specification For;" Paragraph D-1b. The temperature of each crew station and the cargo or passenger compartment shall not vary more than 10 degrees Fahrenheit (5.5 degrees Centigrade) between any two points, ...

Deviation: The air temperature in the cabin may vary more than 10 degrees Fahrenheit between any two points. The distribution system, will maintain air temperatures immediately surrounding the pilot as uniformly as practical.

Reasons for Change and Remarks: In a high performance, high altitude aircraft of this type it is not practical to maintain temperature gradients within ± 5 degrees Fahrenheit of the average.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
76	3.20.1	Air Conditioning

Requirement: Paragraph 12.51 - "Maximum ventilating air rate will usually be determined by cabin-temperature requirements but shall be limited to that value which will not permit air movement past seated crew members at more than 200 feet per minute air velocity."

Deviation: Air movement past seated crew members shall be kept to a minimum but may exceed 200 feet per minute air velocity.

Reason for Change and Remarks: Due to the small cockpit size and high flight speeds the air flow necessary for conditioning the cockpit at altitudes will produce local air velocities in excess of 200 feet per minute.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
77	3.12.9.6	Piping and Fittings

Requirement: Paragraph 13.30 - "The piping and connections utilized in the power plant installation shall conform to the types indicated in Figure 13.2."

Paragraph 15.66 - "Combustible fluid lines in the engine compartment shall be of stainless steel or flame resistant hose construction. The hose shall conform to Specification AN-H-24."

Deviation: (1) Aluminum alloy fuel lines may be used throughout the fuel system as approved by comment on RFA #77 at CTCI Board of 3 March 1954.

(2) Where required, flexible stainless steel hose may be used in lieu of rubber hose.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   AMC Manual 80-1 (Cont)

77 (Cont)   3.12.9.6   Piping and Fittings (Cont)

Reason for Change and Remarks: (1) In the interest of weight saving, the Contractor recommends the use of aluminum alloy tubing for fuel lines in lieu of stainless steel tubing or hose. The aluminum tubing used is not affected by normal operating temperatures, therefore, adequate structural strength is maintained.

(2) Flexible stainless steel hose is lighter, more durable and will withstand higher pressures than rubber hose.

* * * *

78   3.12.9.6   Wall Thickness, Aluminum Alloy

Requirement: Paragraph 13.311 - "Nominal wall thickness of aluminum alloy tubing shall be ...."

Deviation: Fuel system tubing minimum wall thickness may be .035 for 2.00, 2.50 and 3.00 inch aluminum alloy tubing.

Reason for Change and Remarks: To effect weight saving on fuel system tubing by utilizing minimum gage tubing satisfactory for fabrication and still meet the proof pressure of the system.

* * * *

79   3.12.9.6   Wall Thickness, Stainless Steel

Requirement: Paragraph 13.312 - "Nominal wall thickness of stainless steel tubing shall not be less than ...... etc.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

79 (Cont) 3.12.9.6 Wall Thickness, Stainless Steel (Cont)

Deviation: The wall thickness of the stainless steel tubing shall be consistent with fluid pressure requirements. In no case shall the proof pressure of the tubing be less than the proof pressure of the equipment installed. In no instance shall the wall thickness of the tubing be less than that required to prevent the collapse of an AND 10060 Style "A" tube bead if clamp type connectors are used.

Reason for Change and Remarks: Appreciable weight can be saved by selecting tubing in accordance with the above deviation where fabrication permits

* * * *

80 3.12.9 6 Piping and Fittings

Requirement: Paragraph 13.33 - "All fittings such as hose nipples, elbows, flared tube fittings, etc., shall conform to Army-Navy or Air Force Standards. The end fittings, used with the hose assembly conforming to Drawing AN 6264 shall conform to Drawing AN 792."

Deviation: Fittings shall be of light weight as approved by WADC.

Reason for Change and Remarks: Light weight fittings are used to save weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
81	3.12.9.6	Flexible Connections

Requirement: Paragraph 13.330 - "All flexible hose connections utilizing clamps and nipples shall be in accordance with Drawing AND 10065.

Deviation: Not applicable.

Reason for Change and Remarks: Flexible hoses with clamps and nipples are not used in the power plant installation.

* * * *

82	3.12.9.5	Vent System

Requirement: Paragraph 13.344 - "All vents and drain lines shall terminate at a point outside the aircraft, passing through resilient grommets in the engine cowling where necessary to prevent chafing, and they shall be so located or formed that drainage cannot be returned to any part of the aircraft struture or enter the exhaust wash from either up-stream or downstream. Drain lines shall be easily accessible for draining from the outside of the aircraft."

Deviation: Drains and vents shall be so located that fluids will discharge clear when airplane is in static position.

Reason for Change and Remarks: Location of engine exhaust with respect to the engine drains makes compliance with this requirement impossible.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
83	3.12.9.3	Tanks (Fixed) Fuel

Requirement: Paragraph 13.410 - "All combat aircraft including fighter, attack, photographic, cargo (personnel carriers), and bombardment, that have a tactical operating radius of action of fewer than 3,000 nautical miles shall have internal combustible fluid tanks that afford 100% protection against gunfire for the power plant fluid systems. "(Means shall be provided for internal and external purging ... "

Deviation:
(a) Self-sealing tanks are not provided.
(b) Fuel tanks are pressurized.
(c) Internal and external purging is not required.

Reason for Change and Remarks: (a) Self-sealing tanks are ineffective against probable large calibre armament of enemy bombers. Self-sealing tanks reduce fuel capacity and increase weight.

(b) High altitude operation requires pressurization to prevent fuel vaporization. Pressure is used for fuel transfer between tanks.

(c) Due to the type of airplane, high speed and altitude operation, and low wing tank frontal area, fuel tank purging has been eliminated to save weight.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
84	3.12.9.3	Availability of Liquid

Requirement: Paragraph 13.415 "All tanks shall be carefully designed to insure that all of the contained liquid will be usable . . "

Deviation: The fuel tanks shall be designed so that there will be a minimum of unusable fuel.

Reason for Change and Remarks: It is impractical to design the integral tanks and equipment so that all of the fuel will be usable in level flight. The unusable fuel will be as defined in the detail airplane specification.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   AMC Manual 80-1 (Cont)

85   3.12.9.12   Filler Openings

Requirement: Paragraph 13.425 (Entire paragraph).

Deviation: Not applicable.

Reason for Change and Remarks: The fuel tanks are filled by single point pressure refueling only. (Reference Convair Letter 6-3490 dated 1 July 1952).

* * * *

86   3.12.9.9   Tank Gage Units

Requirement: Paragraph 13.426 "Fuel tanks shall be provided with a flange suitable for mounting a gage unit in accordance with Specification AN-G-19.

Deviation: The fuel tank gage system shall be in accordance with Contractor Specification 8-02305.

Reason for Change and Remarks: The capacitor type fuel gage system does not require a flange as per above requirement.

* * * *

87   3.12.8.1.1   Oil Tank Accessibility

Requirement: Paragraph 13 431

(a) It definitely shall not be necessary to remove the engine .... prior to removal of any tank.

(b) It shall be possible to remove any fuel tank .... within 4 hours.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
87 (Cont)	3.12.8.1.1	Oil Tank Accessibility (Cont)

Deviation: (a) It shall be permissable to remove the engine prior to the removal of the oil tank.

(b) Not applicable.

Reason for Change and Remarks: (a) The oil tank is an integral part of the engine. It is impracticable to provide access throughout the fuselage to permit removal of the tank with the engine installed in the airplane.

(b) The fuel tanks are built as an integral part of the wing structure.

* * * *

Deviation	Paragraph	
88	3.5.1	Wing - Description and Components

Requirement: Paragraph 13.74 - "Integral fuel tanks which consist of the aircraft structure sealed by means of elastic films, gaskets, caulking compounds, etc., (as differentiated from 'bladder' type cells) shall not be used in Air Force aircraft."

Deviation: Integral Fuel tanks shall be used.

Reason for Change and Remarks: Considerable previous experience by this Contractor in designing and fabrication of integral fuel tanks, both military and commercial application, have shown them to be satisfactory. Integral tanks provide maximum fuel capacity and minimum weight. Integral fuel tanks shall be fabricated in accordance with CVAC report 8-00010 which was approved by AMC LTR MCPPAF-6 (WCSF-6) RGA/feb dated 27 May 1954.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
89	2.2	Applicable Specifications

Requirement: Paragraph 15.15 Power Plant Testing - "One aircraft of each model, as determined by the procuring agency will be subjected to a complete set of ground and flight tests in accordance with AMC Engineering Division Memorandum Report No. TSEPP-506 - 122."

Deviation: Power Plant testing shall be in accordance withAMC Engineering Division Memorandum Report No. WCNEI-525-460 dated 15 June 1951.

Reason for Change and Remarks: AMC Engineering Division Memorandum Report No. TSEPP-506-122 has been superseded by Memorandum Report NO. WCNEI-525-460.

* * * *

Deviation	Paragraph	
90	3.11	Engine Section

Requirement:
Paragraph 15.26 - "Quick-Change Power Plant."
Paragraph 15.270 - "Quick-Change Requirements."
Paragraph 15.28 - "Maintenance - Inspection, Cleaning and Adjustment."
Paragraph 15.29 - "Maintenance - Removal And Replacement."

Deviation: Requirements of above shall be as approved by the CTC Board.

Reason for Change and Remarks: CTCI Board is to determine degree of compliance with above requirements.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

91 3.12.9.3 Tanks (Fixed)

Requirement: Paragraph 15.412 - "Aluminum and aluminum alloy shall be protected from corrosion with corrosion-resistant cartridge conforming to Drawing No. AN-4043."

Deviation: Anti-corrosion cartridge will not be used.

Reason for Change and Remarks: Design of fuel tanks will not accommodate AN cartridge.

* * * *

92 3.12.9.3 Tanks (Fixed)

Requirement: Paragraph 15.421 - "The fuel-outlet fitting from all fuel tanks, except external jettison tanks, shall be a booster-pump flange ....."

Deviation: Booster-pump flange shall not be required on tanks 1 and 2, left and right.

Reason for Change and Remarks: The booster-pump is installed within No. 3 tank. Booster-pumps are not used in tanks No. 1 and 2. The No. 3 tank configuration does not permit use of booster-pump flanges as an outlet fitting.

* * * *

93 3.12.9.3 Tanks (Fixed)

Requirement: Paragraph 15.422 - "Each fuel tank shall be provided with a sump - - - - - "

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

93 (Cont) 3.12.9.3 Tanks (Fixed) (Cont)

Deviation: No separate fuel tank sump shall be provided.

Reason for Change and Remarks: Since the fuel tank is built integrally with the wing structure, it is not possible to provide a sump without extending into the air stream. Sediment and water can collect in the unusable fuel space, for which there are drain provisions.

* * * *

94 3.12.9.5 Vent System

Requirement: Paragraph 15.424 - "One vent connection shall be installed for each fuel tank and located at the high point of the tank when the aircraft is in normal ground position."

Deviation: Conventional type vent system shall not be provided.

Reason for Change and Remarks: Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

* * * *

95 3.12.8.1 Lubricating System - Description and Components

3.12.9.13 Refueling Provisions.

Requirement: Paragraph 15.425a - "Cap shall conform to AAF Drawing No. 39B5435 with an Adapter in accordance with AAF Drawing No. 39B5294 or 44B13830."

Deviation: Fuel and oil caps may be other than that specified, which are no longer acceptable for new installation.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
95 (Cont)	3.12.8.1	Lubricationg System - Description and Components
	3.12.9.13	Refueling Provisions (Cont)

Reason for Change and Remarks: Inasmuch as pressure refueling only is being provided, a special light weight bayonet locking cap will be used on the pressure refueling fitting. The oil cap as approved by WADC shall be as furnished with the engine in accordance with applicable engine specifications.

* * * *

96 3.12.8.1.1 Oil Tank Accessibility

Requirement: Paragraph 15.431 - "Oil tank shall be changed within 30 minutes."

Deviation: Not applicable.

Reason for Change and Remarks: (Ref. dev. requested for Paragraph 13.431). As the tanks are an integral part of the engine, this requirement does not apply with the engine installed. With the engine removed, the oil tank is readily removable.

* * * *

97 3.11.5 Firewalls

Requirement: Paragraph 15.61 Engine Isolation - "Each engine installation of all aircraft, regardless of the number or relative position of the engines, shall incorporate a stainless steel diaphragm that separates the burner and tailpipe section from accessory section."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | AMC Manual 80-1 (Cont)

97 (Cont) | 3.11.5 | Firewalls (Cont)

Deviation: It shall be permissible to use titanium in lieu of stainless steel for firewalls or shrouding.

Reason for Change and Remarks: Titanium is recognized as a suitable material for firewalls and shrouds where redundant structure is involved. Considerable weight saving can be obtained by using titanium in lieu of stainless steel.

* * * *

98 | 3.11 | Engine Section

Requirement: Paragraph 15.62 - (1) "All fuel-tank compartments (considering each group of connected cells as a tank), engine compartments, interior of wing, and interior of fuselage proper shall be isolated from each other with a liquid, gas, and fire-tight seal."

(2) All fuel tanks - - - shall be fitted with drains at all low points at least 1/2 inch in diameter.

Deviation: (1) A vertical aluminum alloy bulkhead shall be installed forward of the engine compressor inlet. A horizontal aluminum alloy shroud extending aft from the bulkhead over the wheel bay shall be installed. A longitudinal vertical firewall shall be provided between the wing fuel tanks and the engine compartment; seal compartment between wing tank and titanium firewall such that fuel will drain out of the compartment and not enter the engine compartment. Fire resistant shrouds shall surround the fuel shut-off valves.

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
98 (Cont)	3.11	Engine Section (Cont)

A fire resistant shroud shall surround the turbine and afterburner from the engine firewall aft. All the above firewall bulkheads and shrouds will be as liquid and gas tight as possible.

(2) The fuel tanks shall be fitted with a flush mounted self-locking drain cock which shall have a drain area equal to or greater than a 1/4 inch tube size non-threaded opening.

Reason for Change and Remarks: (1) The contractor considers that the above proposed isolation of fuel, engine compartments and fuselage is adequate for this type of airplane. An appreciable weight saving is realized in following this proposal.

(2) Fuel tank drains shall be installed in general accordance with paragraph 15.422 of AMC Manual 80-1 which requires a 1/4 inch tube size straight thread opening with an approved self-locking drain cock.

* * * *

99 3.12.9.3 Tanks (Fixed) - Fuel

Requirement: Paragraph 15.63 - "The inside of the tank compartments should be sprayed with anti-sparking paint such as clear lacquer.

Deviation: Anti-sparking paint shall not be used in conjunction with integral tanks.

Reason for Change and Remarks: The Contractor's past experience shows that anti-sparking paint is of no value.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
100	3.12.9.10	Drainage Provisions

Requirement: Paragraph 15.63 - "Each compartment will be drained by a 1/2 inch hole at the low point in normal flight altitude and on the ground, using two holes if necessary. These drain holes shall be at least 5 feet away from open exhaust and shall not be upstream or downstream of the exhaust wash."

Deviation: (1) It shall be permissible for the drain holes to be located upstream of the exhaust wash.

(2) Not less than one-fourth inch diameter holes shall be used.

Reason for Change and Remarks: (1) Due to the configuration of the airplane, it is impracticable to comply with the above requirements. Drain holes will be located upstream of the exhaust wash.

(2) Aerodynamic consideration prevents use of 1/2 inch holes.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
101	3.11.5	Firewalls

Requirement: Paragraph 15.67 - "Insulating blankets shall be protected from damage during handling by a layer of wire screen on the inside and outside surfaces."

Deviation: Protective wire screen shall not be required on insulating blankets.

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

101 (Cont) 3.11.5 Firewalls (Cont)

Reason for Change and Remarks: The insulating blankets are installed on the inside of the engine mounted shroud, therefore they are adequately protected from damage during installation and operation of the engine. The insulation is surrounded by inconel foil which is adequate protection during installation of the blankets in the shroud.

* * * *

102. 3.2.2 Materials

3.11 Engine Section

3.11.5 Firewalls

Requirement: Paragraph 15.68 - "All aircraft components, including equipment and structure that might be critically affected by fires occuring in or around the engine, shall be adeqately protected by stainless steel shrouding or firewalls."

Deviation: It shall be permissible to use titanium in lieu of stainless steel for firewalls or shrouding.

Reason for Change and Remarks: Titanium is recognized as a suitable material for firewalls and shrouds, also considerable weight saving can be obtained by using titanium in lieu of stainless steel.

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103 3.11.8 Fire Access Door

Requirement: Paragraph 15.692 - "The door shall be located .... aft of the diaphragm."

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
103 (Cont)	3.11.8	Fire Access Door (Cont)
	Deviation:	The fire access door shall be located in a convenient position near the bottom of the fuselage and shall allow the extinguishing agent to discharge into the compressor and accessory section. The location shall be as approved by the CTCI Board.
	Reason for Change and Remarks:	To offer the maximum protection to the fuselage structure in the event of a fire.

* * * *

104	3.11	Engine Section
	Requirement:	Paragraph 16.12 - (1) Maximum Temperatures - Maximum Allowable Temperature - Structure, aluminum alloy (75ST), 200°F (93.3°C). (2) The maximum allowable accessory compartment temperature shall be 160° F (71° C). (3) The maximum allowable generator temperature 185° F (85° C).
	Deviation:	(1) It shall be permissible for aircraft structural members of magnesium alloy and 75ST aluminum alloy to be heated to not more than 250° F. (2) It shall be possible for the accessory compartment temperatures to reach 250° F maximum. (3) It shall be permissible for the generator to be in a compartment where the temperature may reach 250° F Maximum.

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
104 (Cont)	3.11	Engine Section (Cont)

Reason for Change and Remarks: (1) In some instances aircraft components will reach temperatures in excess of 200° F. Allowance for strength reduction, due to high temperatures, will be made.

(2) and (3) Due to the high speed of this airplane and result of aerodynamic heating, the accessory compartment may reach a maximum temperature of 250 F for short periods of time. The generator procurement specification covers this temperature.

* * * *

105	3.12.7	Cooling System

Requirement: Paragraph 16.130 - The design of the cooling system shall be such that the cooling air flow is undirectional.

Deviation: The accessory compartment shall be cooled on the ground by reverse air flow through the compartment into the engine inlet duct.

Reason for Change and Remarks: Until the airplane gains sufficient speed to provide ram air for accessory compartment cooling, air flow through the accessory compartment caused by the negative pressure in the engine inlet ducts is the only practical method of cooling, without severe weight penalties.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
106	3.12.7	Cooling System

Requirement: Paragraph 16.131 - The cooling air intake for the aft compartment shall be located aft of the engine diaphragm. The intake for the forward compartment cooling system shall not be taken from the engine air induction system duct; this is to prevent flow reversals in the cooling system from supplying heated air to the engine during ground operation.

Deviation: It shall be permissible to utilize air flow from the engine induction system for aft compartment cooling. The forward compartment shall be cooled by air bled off the engine induction system and exhausted at the rear of the airplane.

Reason for Change and Remarks: In order to achieve the lightest, most practical engine installation with the least cooling system drag loss, air is bled off the engine duct for cooling the turbine and afterburner compartment during flight. On the ground, engine compressor air is ducted into the area thru a stainless steel duct and shut off valve. A check valve is inserted in the system to prevent the hot air from the afterburner compartment from entering the engine duct. The air from the accessory compartment being sucked into the engine during ground operation constitutes such a small percentage of the total engine air flow, no adverse effects are experienced.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
107	3.12.7	Cooling System

Requirement: Paragraph 16.132 - Compartment Cooling - Entire paragraph.

CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
107 (Cont)	3.12.7	Cooling System (Cont)

Deviation: Cooling air for the aft engine compartment may be taken from the engine inlet duct and ducted to the aft compartment through fibreglas and aluminum ducts which pass through the accessory compartment.

Reason for Change and Remarks: Fire hazard is not increased by use of non fire-resistant ducting during in-flight operation. Reverse flow through the non fire-resistant ducting is prevented by a fire-resistant check valve located adjacent to the engine firewall.

* * * *

108 3.12.8 Lubricating System

Requirement: Section 16.2 - Lubrication Systems

Deviation: This section of the handbook is not applicable to this airplane.

Reason for Change and Remarks: The turbo-jet engines specified for this airplane are equipped with an integral oil system and no air frame connections are required, except for installing an additional air-to-oil cooler and venting the accessory gear box.

* * * *

109 3.12.8.1 Lubricating System - Description and Components

Requirement: Paragraph 16.22 - "The lubricating system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. AN-O 8."

CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
109 (Cont)	3.12.8.1	Lubricating System - Description and Components (Cont)

Deviation: The lubrication system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. MIL-L-7808.

Reason for Change and Remarks: In accordance with Pratt & Whitney J-57 Information Letter No. 43, dated 23 November 1951, the synthetic oil for use in JT3 engines is Pratt & Whitney Specification No. 521, Government Agency Specification No. MIL-L-7808.

* * * *

Deviation	Paragraph	
110	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.262 - Oil Cooler Selection - (Same as Oil Cooler Selection under 14.24) - "Oil coolers used in production aircraft shall comply with the requirements of Specification No. AN-C-75."

Deviation: Oil coolers shall conform to Contractors Specification. The cooler shall be of the plate type in lieu of the tubular type construction.

Reason for Change and Remarks: To permit use of latest type coolers to save weight. Contractor's Specification to be submitted to WADC for approval.

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CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
111	3.12.8.1	Oil Cooler Installation

Requirement: Paragraph 16.263c - "The area of the outlet from the oil cooler shall be at least equal to the total inlet area of the engine oil pump."

Deviation: The area of the outlet from the oil cooler shall be large enough to prevent exceeding the engine manufacturer's limit on the oil scavenge pump back pressure.

Reason for Change and Remarks: A weight saving can be effected by the use of smaller lines and fittings while keeping within allowable back pressure limits.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
112	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.263e - "Oil Cooler Mounting (Same as Mounting under 14.252)."

Deviation: Not applicable to type of oil cooler design proposed. The oil coolers shall be vibration tested as specified in paragraph 4.3.2.8.1 of Convair Specification 8-02347.

Reason for Change and Remarks: Mounting requirements specified are not applicable to type of coolers being used.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

113 3.12.8.1 Oil Cooler installation

Requirement: Paragraph 16.263f - "An approved oil temperature regulation valve which includes a surge protection valve conforming to Drawing 12N4103, shall be mounted on the oil coller."

Deviation: No oil temperature regulating valve shall be provided.

Reason for Change and Remarks: Oil temperature control is accomplished by a temperature control valve on the fuel-oil cooler. The engine system can withstand the maximum back pressures created by cold oil flowing through the cooler core, and the plate type coolers do not require surge or pressure protection.

* * * *

114 3.12.8.1 Lubricating System - Description and Components

Requirement: Paragraph 16.278 - Engine Breather Lines - "This point shall be so located that oil or fumes will not be discharged onto the windshield or flow into the cockpit and shall be visible to the pilot in flight."

Deviation: It is not necessary that the breather line terminate at a point visible to the pilot in flight.

Reason for Change and Remarks: Since the engine breather connection is located approximately 22 feet aft of the pilot, it is not practical to run the breather line forward.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
115	3.12.9.1	Fuel System - Description and Components

Requirement: Paragraph 16.302 - "The entire fuel system shall be designed for the use of Specification No. AN-F-58 fuel. It shall also be capable of satisfactory operation with Specifications No. AN-F-32 and AN-F-48 fuels."

Deviation: Fuel system shall be designed to operate with fuel covered by Specification No. MIL-F-5624A, Grade JP-4 and in emergency on MIL-F-5572 fuel.

Reason for Change and Remarks: The engine specified for this aircraft is designed to operate on JP-4 fuel normally and on MIL-F-5572 in an emergency with certain airplane performance limitations as specified in 3.12.9.1 herein.

* * * *

116	3.12.9.1	Fuel System - Description and Components

Requirement: Paragraph 16.31 - "Design Requirements."

Deviation: In lieu of the requirements set forth in the HIAD, Section 16.31, the fuel system of the aircraft shall be designed as shown on Convair Drawing No. 8-20304, which shall be submitted to WADC for design approval.

Reason for Change and Remarks: Due to the Unconventional fuel system, the requirements of the HIAD do not apply.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

117 3.12.9.5 Vent System - Fuel

Requirement: Paragraph 16.34 - Fuel Tank Vent System (Same as Vent System under 14.33) - "Each fuel tank shall have one vent system with one common outlet."

Deviation: Conventional type vent system shall not be provided.

Reason for Change and Remarks: Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

* * * *

118 3.12.9 Fuel System

Requirement: The fuel system design requirements per 16.32 and the vent system requirements per 16.34, 16.342, and 16.346 of HIAD requires actual airplane tests for installation approval in accordance with Memo Report No. WCNEI-525-460, Section E.

Deviation: The airplane fuel system shall be tested in accordance with the requirements of Convair Report No. ZK-8-029 as approved by USAF and applicable portions of Section E of No. WCNEI-525-460 on a full scale ground system mock-up rig in lieu of the actual airplane.

Reason for Change and Remarks: It is impractical to conduct fuel systems tests on the airplane with this type of installation.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

119 3.12.9.5 Vent System

Requirement: Paragraph 16.345 - "For all other tanks, the internal pressure shall not exceed the external pressure by more than 13.6 inches of water. With fuel having a Reid vapor pressure not greater than 7.0 psi, the maximum allowable pressure in the fuel tank during maximum climb rate shall not exceed 54 inches of water and, when airplane is flying at a fixed altitude after climb, the pressure differential shall decrease to 7 inches of water within 20 minutes."

Deviation: The fuel tank internal pressure shall be sufficient to accomplish the transfer of fuel from tank to tank as required for automatic c-g control.

Reason for Change and Remarks: This airplane incorporates a tank pressurization system which eliminates the conventional vent system requirements.

* * * *

120 3.12.9.2 Pumps

Requirement: Paragraph 16.351 - "Booster Pumps"

Deviation: The following shall apply in lieu of the requirements specified in paragraph 16.351. Suitable alternating current centrifugal booster pumps procured to the Contractor Specification shall be provided which may not be mounted directly on the bottom of the tank. Drain lines are not required on alternating current pumps.

Reason for Change and Remarks: Conventional booster pump mounting and installation methods cannot be followed due to the depth and location of the fuel tanks.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

121 3.12.9.1 Controls - Fuel System

Requirement: Paragraph 16.352 - "Fuel valve controls shall be marked red . . .."

Deviation: Fuel valve controls need not be marked red, but shall be suitably identified.

Reason for Change and Remarks: The fuel control panel will utilize edge lighting which does not lend itself for special color identification.

* * * *

122 3.12.9.8 Fuel System - Strainer and Filters

Requirement: Paragraph 16.353 - "Fuel strainers in accordance with Drawings AN4108, AN4109 and AN4145 shall be used."

Deviation: Fuel strainers or filters are not required. In lieu thereof a #8 mesh screen may be installed in the fuel line near the engine to afford protection to the engine pumps.

Reason for Change and Remarks: To preclude excessive fuel pressure drop. Fuel strainers per Drawing AN4109 are of insufficient capacity.

* * * *

123 3.14.1 Instruments

Requirement: Paragraph 19.0 - "The instruments and instrument boards required shall be installed in accordance with Specification No. AN-I-2."

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

123 (Cont) 3.14.1 Instruments (Cont)

Deviation: Instruments and instrument boards required shall be installed in accordance with Specification No. MIL-I-5997, except as specified herein.

Reason for Change and Remarks: To establish the specification the Contractor proposed to use.

* * * *

124 3.14.3 Installation - Instruments

Requirement: Paragraph 19.00 - "A minimum clearance of 10 inches shall be provided behind the instrument board to accommodate the instruments and connections when installed." "Unless otherwise specified, instruments shall be front-mounted; i.e., with the flange of the instrument on the face of the board instead of the rear."

Deviation: A minimum clearance of 6 inches shall be provided behind the instrument board, except at extreme outboard edges in area of "V" type windshield structure. Instruments shall be backmounted.

Reason for Change and Remarks: The configuration of the instrument panel and the space limitations of the cockpit will not allow 10 inches clearance behind the instrument board. The use of sandwich-type panel lighting necessitates the back mounting of instruments.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation — Paragraph — AMC Manual 80-1 (Cont)

125 — 3.14.3 — Installation - Instruments

Requirement: Paragraph 19.04 - "The instruments shall be arranged substantially in accordance with the applicable figure on Drawing AD3001."

Deviation: The instruments shall be arranged substantially in accordance with the applicable figure on Drawing AD3001, except as approved by Mock-Up Board Meeting of 28 and 29 July 1954.

Reason for Change and Remarks: Space limitations and the prime consideration of the pilot's display of the fire control system.

* * * *

126 — 3.14.3 — Installation - Instruments

Requirement: Paragraph 19.161 - Remote Compass - "Installation shall be made in accordance with applicable specification ...." "Type J-2 magnetic remote slaved gyro compass Specification No. 21181."

Deviation: Installation of Type J-2 magnetic remote slaved gyro compass shall be in accordance with MIL-C-6588.

Reason for Change and Remarks: To comply with latest specification. (Reference Convair letter 6-1851 dated 29 April 1954).

* * * *

127 — 3.14.1 — Instruments

Requirement: Paragraph 19.19 - "All aircraft with anti-g equipment shall have an accelerometer in accordance with Drawing AN5745."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
127 (Cont)	3.14.1	Instruments (Cont)

Deviation: No accelerometer is required.

Reason for Change and Remarks: The accelerometer serves no useful purpose on this airplane.

* * * *

Deviation	Paragraph	
128	3.16.11.2	Signal Assemblies

Requirement: Paragraph 19.46 - The type C-1 landing gear position indicator, Specification No. 21250 shall be installed in accordance with Specification No. 32300.

Deviation: The AN5839 landing gear position indicator, Specification No. MIL-I-6839 shall be installed in accordance with Specification No. MIL-E-7563 as deviated in this Specification.

Reason for Change and Remarks: To specify applicable specifications.

* * * *

Deviation	Paragraph	
129	3.14.3	Installation - Instruments

Requirement: Page 19-4, Figure 19-3 - "Installation of Directional Gyro and Gyro Horizon."

Deviation: The specified instruments may not be installed in accordance with Figure 19-3.

Reason for Change and Remarks: The Contractor proposes to use small instruments to conserve space. The space limitations of the instrument panel makes it impracticable to comply with Figure 19-3.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
130	3.17.1.1	Control Console

Requirement: Paragraph 20.2 - "Space and mounting provisions shall be made for the original panels to be easily replaced by longer panels so that other panels may be added in case of a change in radio or radar requirements after completion of the airplane design. The extra space provided shall amount to 20% of that required for the installed controls."

Deviation: Twenty percent space of that required for the installed controls shall not be provided.

Reason for Change and Remarks: Due to quantity of equipment installed and to type of aircraft, there is insufficient space available to meet the above requirement.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
131	3.18	Armament

Requirement: Paragraph 21.111 - This paragraph specifies Armament ground and air test per Spec. 34014.

Deviation: Armament ground and air testing per CVAC Report ZM-8-086 in lieu of 34014.

Reason for Change and Remarks: Spec.. 34014 is not applicable for testing missiles and FFAR.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

132 3.18.6 Passive Defense

Requirement: Paragraph 21.920 - "Protection shall be provided in all tactical AF aircraft for the crew and vital aircraft components against gunfire in accordance with the following general requirements."

Paragraph 21.921 - "Fighter Aricraft" - This paragraph gives specific requirements for fighter aircraft armor.

Deviation: Passive defense shall not be provided.

Reason for Change and Remarks: Unnecessary weight. The low grazing angles of the fuselage forward of the pilot, plus the rugged radome and the mass of radar equipment forward of the pilot are considered to be ample protection.

* * * *

133 3.19.1 1 Safety Belt and Shoulder Harness

Requirement: Paragraph 23.110. - "All crew and passenger seats shall be equipped with a belt; aircraft safety, Type B-14."

Paragraph 23.111 - "All crew and passenger seats, except those permanently faced rearward shall be provided with the belt, safety, shoulder harness, Type B-16."

Deviation: An automatic-opening lap type safety belt and an adjustable safety shoulder harness as specified in Appendix 1-A shall be installed.

Reason for Change and Remarks: WADC specified above equipment for this airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
134	3.16.7	Controls - Electrical

Requirement: Paragraph 23.14 - "Heated clothing rheostat, Type Q-1B, in accordance with Specification No. 94-32357, shall be installed at each crew station in all bombers and large aircraft of 15,000 pounds gross weight or larger .....".

Deviation: Heated clothing rheostat shall not be required. A rheostat and receptacle as approved by WADC shall be provided for electrical heating of partial pressure suit face plate.

Reason for Change and Remarks: Heated clothing not required in that the cockpit is air conditioned.

* * * *

Deviation	Paragraph	
135	3.19.2	Miscellaneous Equipment

Requirement: Paragraph 23.26 - "All aircraft shall be equipped with a baggage and tool locker or compartment appropriate to the crew and intended mission of the aircraft, etc., etc."

Deviation: Baggage compartment or tool compartment shall not be required.

Reason for Change and Remarks: Mock-up Board Decision. Nose section inspection held at CVAC 28-29 July 1954. R.F.A. #66.

* * * *

Deviation	Paragraph	
136	3.19.1	Accommodations for Personnel - Smoking Facilities

Requirement: Paragraph 23.28 - Compartments where smoking is permitted shall be equipped with ash trays of the self-contained type which are completely removable, and where practicable, with electric lighters. All other compartments shall be placarded against smoking.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
136 (Cont)	3.19.1	Accommodations for Personnel - Smoking Facilities (Cont)

Deviation: No ash tray or electric lighter shall be provided. Compartment shall not be placarded against smoking.

Reason for Change and Remarks: Approval by Nose Section Mock-Up Board Inspection of 28-29 July 1954. Ref. RFA #66.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
137	3.19.2.2	Map and Data Case

Requirement: Paragraph 23.230 - Data Case - "To provide an aircraft data case, Dwg. No. 36G2873, shall be installed in all aircraft.

Paragraph 23.233 - Flight Report Holder - "All aircraft shall be equipped with a flight report holder, Type A-2, in accordance with Drawing 0161366."

Paragraph 23.234 - Map Case - "Aircraft having a cruising range over 600 miles shall be equipped with a map case at least 9 x 12 x 4 inches.

Deviation: A combination flight report holder, data and map case shall be provided, which dimensions shall be 9x12 x 3.75 inches.

Reason for Change and Remarks: Relatively short flight duration and large ammount of electronic navigational aids installed, obviate need for separate flight report holder map and data cases. The combination case will be the size specified in Paragraph 23.234 except for thickness.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
138	3.2.2	Materials
	3.11.5	Firewalls

Requirement: Paragraph 24.00 - "Aircraft designers shall utilize materials and processes approved for USAF use, which are listed not only in the USAF Index of Specifications, and Bulletins approved for USAF Procurement, but also in USAF Bulletin No. 23."

Deviation: (A) Components of the airframe as illustrated by the list below may be manufactured of metal honeycomb construction, metal-to-metal bonded construction, or glass fiber plastic honeycomb construction providing process specifications controlling the complete construction and inspection of the components are submitted for USAF approval and providing each primary structural application is submitted for USAF approval.

1. Wing Tip
2. Fin Tip
3. Rudder
4. Nose Wheel Door
5. Elevon Trailing Edge
6. RAT Door
7. Engine Intake Duct
8. Cockpit Side Panels
9. Access Doors
10. Wing Fences

(B) The use of Inconel W alloy is permitted, subject to specific approval of each application by WADC.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
138	3.2.2	Materials (Cont)
	3.11.5	Firewalls

(C) Structural and non-structural applications of titanium and titanium alloys in accordance with AMS-4900, AMS-4901, AMS-4908, AMS-4921, AMS-4925, USAF Specification Bulletin No. 108A, and Convair Specification No. 0-01008 shall be permitted subject to individual application approval by WADC. Other titanium alloys may be used as WADC approval is granted.

(D) The use of 24S bare aluminum alloy, sheet and extrusion, solution heat treated and artificially aged shall be permitted and the design allowables shall be based on the recommended physical properties of ANC-5 and Convair Report ZS-205 revised 25 May 1954 titled "Mechanical Properties of Artificially Aged 24S Material."

Reason for Change and Remarks: (A) Permits higher production with lower cost and decreased weight.

(B) Inconel W is approved by AMC letter MCPPAF-6 (WCSF-6) RGA/met dated 6 November 1953.

(C) Due to optimum strength-weight ratio, considerable weight savings are made possible.

(D) The use of bare 24S aluminum alloys provides higher physical properties and a resulting weight saving. Verbal Approval was given by Materials Lab.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

139 **Requirement:** Paragraph 24.122 - "Arc-welding electrodes conforming to Specification AN-E-9 .... are preferred...."

Deviation: In addition, heat treatable welding electrodes as specified in Convair Specification 0-01004 may be used for structural application providing the design allowables of Convair report ZS-194 "Heat Treatable Welds in Steel Plate" are used.

Reason for Change and Remarks: To provide higher strength welds. Specifications 0-01004 and ZS-194 were approved by AMC letters MCPPAF-6 (WCSF-6) RGA/met dated 23 Sept 1953 and MCPPAF-6 (WCSF-6) RGA/met dated 23 December 1953.

* * * *

140 3.2.2 Materials

Requirement: Paragraph 24.123 - "The joints shall be designed, fabricated, inspected and accepted in accordance with Specification AN-W-30 ....."

Deviation: Spot welding of commercially pure titanium sheet shall be permitted in accordance with Convair Specification 0-05003.

Reason for Change and Remarks: Convair Specification 0-05003 was approved by AMC letter MCPPAF-6 (WCSF-6) RGA/feb dated 12 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
141	3.4	Structural Design Criteria

Requirement: Paragraph 25.1 - "Demonstration flights of aircraft shall be conducted in accordance with Specification No. R-1803-11."

Deviation: The requirements shall be as outlined in Contractor's Report No. ZM-8-002 "Structural Integrity Flight Demonstration" which shall be subject to WADC approval. It shall be used in lieu of Specification No. R-1803-11 dated 1 August 1947.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range and purpose of the aircraft.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
142	3.19.2.1	Instrument Panel

Requirement: Sheet 3 of 3 - Landing Gear position indicators shown immediately above Landing gear control handle.

Deviation: Landing gear position indicators shall be located on the left side of the main instrument panel.

Reason for Change and Remarks: (a) Location in agreement with ANA Bulletin #386.

(b) Location approved by Mock-Up Board of 28-29 July 1954. Ref. RFA #37.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
143	3.16.8.2	Interior Lights

Requirement: Sheet 3 of 3 - Lighting switches to be in R. H. console.

Deviation: Lighting switches shall be located on utility switch panel located below main instrument and armament panels.

Reason for Change and Remarks: Location approved by Mock-Up Board of 28-29 July 1954. Ref. RFA #14.

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144	3.10.4.2	Pilot Assist System
	3.17.1.1	Control Panels

Requirement: Sheet 3 of 3 - Lighting, De-icing and Pitot Heat controls shown on R. H. console.

Deviation: Data link and Pilot assist panels shall be located in R. H. console in lieu of equipment shown above.

Reason for Change and Remarks: Location approved by Mock-Up Board of 28-29 July 1954. Ref. RFA #16.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-B-2a, Dated 20 August 1947 - Brake System: Aircraft, Design of
145	3.8.2.2	Brakes

Requirement: Paragraph C-1 - "This capacity shall normally consist of 100 stops at 10 feet per second per second deceleration at the design gross weight condition of the airplane or 0.9 times the maximum alternate weight, whichever is larger."

Deviation: The capacity of the brakes shall be 50 stops consisting of: 40 stops at design landing gross weight (22,071#) 10 stops at 0.9 maximum alternate gross weight, and 1 stop at maximum alternate gross weight (31,559#). The first two conditions at a deceleration of 10 feet per second per second, the last at a deceleration of 6 feet per second per second.

Reason for Change and Remarks: An appreciable weight saving is realized by using 50 stop brakes. Also, the use of a brake parachute and high induced drag during landing attitude reduce brake equipment.

* * * *

146	3.8.2.2	Brakes

Requirement: Paragraph D-4b and D-4e (4)a - Parking Locks

Deviation: Parking locks are not required.

Reason for Change and Remarks: Cockpit Mock-Up Board agreed that parking brakes were not required for this airplane.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification AN-B-4b (1) Dated 7 September 1949, Bearings: Anti-Friction Airframe Ball
147	3.2.11.1	Bearings

Requirement: Paragraph D-1b (1) - " ...the closure shall be a composition contact seal which will operate satisfactorily at conditions specified in Section F.

Deviation: Anti-friction bearings without fixed seals may be used in the secondary controls systems.

Reason for Change and Remarks: To save weight and simplify design, bearings of the Fafnir B500 series (unshielded) may be used. Removable stainless steel shields will be added at each application for retaining the lubricant.

* * * *

148 3.2.11.1 Bearings

Requirement: Paragraph D-6 Lubrication - "The bearings shall be packed with grease conforming to Specification AN-G-25.."

Deviation: Anti-friction bearings used in high temperature areas shall be packed with high temperature lubricant, Dow-Corning DC-44 or equivalent.

Reason for Change and Remarks: To provide high temperature lubricant in bearings required in the high temperature areas. (Deviation approved by AMC letter of 28 August 1953).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-J-5 (2), Dated 26 November 1947 - Jack Pads; Design and Installation of (for Aircraft)
149	3.22.2	Jacking Provisions

Requirement: Paragraph E-1a (2) - "Aircraft having a gross weight between 19,000 and 100,000 pounds shall be provided with four jack pads on the wings or nacelles (two on each side)."

Deviation: Two jack pads shall be installed on the wing (one on each side).

Reason for Change and Remarks: Due to the short span of the wing it is not practical to use two jack pads on each side.

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150	3.22.2	Jacking Provisions

Requirement: Paragraph E-1C (2) - "Aircraft having a gross weight of 20,000 pounds or less shall be provided with one jack pad and aircraft having a gross weight of over 20,000 pounds shall be provided with two jack pads, located on the centerline of the aircraft near the nose wheel to permit easy removal, replacement or the servicing of the nose wheel assembly, complete or in part. If the design of the aircraft is such as to make this arrangement impractical from the standpoint of additional weight, interference with nose wheel retraction, etc., the jack pad or pads may be provided and located as near the centerline of the aircraft as possible. When two jack pads are provided, each individual jack pad shall be capable of safely supporting the weight of the nose section."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Spec. AN-J-5 (2) (Cont)
150 (Cont)	3.22.2	Jacking Provisions (Cont)

Deviation: Jacking of the nose section of the aircraft shall be accomplished by the use of a single jack, on a bar (ground handling equipment), which is to be located on the centerline of the airplane in the center electronics bay opening. The center electronics bay door shall not be operative with the aircraft on jacks.

Reason for Change and Remarks: Configuration of the aircraft is such that an additional jack applied under any structure capable of supporting the aircraft (which would permit operation of the nose gear) would result in a marked increase in weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AN-I-21A (2), Dated 2 May 1947, Interchangeability and Replaceability of Component Parts for Airplanes
151	3.2.5.	Interchangeability and Replaceability

Requirement: Specification No. AN-I-21A (2).

Deviation: The component parts of the airplane will be interchangeable or replaceable, as the case may be, as specified in Appendix IIIA which is in general accordance with Specification No. AN-I-21

Reason for Change and Remarks: To establish the degree of interchangeability and replaceability.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. R-1800-E (5), Dated 28 May 1945-Aircraft, General Specification for
152	3.2.11.1	Bearings

Requirement: Paragraph D-3 - ". . . . Whenever AAF Standard utility parts cannot be used, the special parts shall be so fabricated that they will not be dimensionally interchangeable with AAF Standard utility parts and their appearance shall be readily distinguishable."

Deviation: Certain anti-friction bearings will be interchangeable dimensionally with other standard anti-friction bearings but will utilize high temperature lubricants and will be marked to indicate the high temperature usage.

Reason for Change and Remarks: Anti-friction bearings utilizing high temperature lubricants required in high temperature areas. (Deviation approved by AMC Ltr of 28 August 1953).

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153	4.1	Sampling Inspection and Test

Requirement: Paragraph D-15 - Magnetic Inspection - At least the following primary structural assemblies, if fabricated of ferrous materials, shall be magnetically inspected in accordance with Specification AN-I-32; etc.

Paragraph D-15a - Bolts - Bolts to be used in primary and other important assemblies and locations shall be magnetically inspected. The Contractor shall furnish a list of these assemblies showing the location of all important bolts identified by AN part number if it is a standard bolt, and by the Contractor's part number if it is a special bolt.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. R-1800-E(5), (Cont)
153 (Cont)	4.1	Sampling Inspection and Test (Cont)
	Deviation	Not applicable. Magnetic inspection shall be in accordance with Specification No. MIL-I-6868.

Reason for Change and Remarks: These requirements have been restated in AN-I-39, MIL-I-6870 and MIL-I-6870A on succeeding dates and the existence of the old requirements are considered redundant and confusing. (Ref Convair Ltr 6-795 dated 26 Feb. 1954).

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENT

Deviation	Paragraph	AAF Specification No. 1815B, Dated 1 June 1948 - Stability and Control Characteristics for Airplanes
154	3.3.2.1	Stability and Control

Requirement: Paragraph 2.4 - "V_S indicated stalling speed, corrected for instrument and position error, at the gross weight corresponding to the specified condition."

Deviation V_S shall be defined as that speed attainable with $C_L = 0.75$, corrected for instrument and position error, at the gross weight corresponding to the specified condition.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

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Deviation	Paragraph	
155	3.3.2.1	Stability and Control

Requirement: Paragraph 4.1 - "Dynamic Longitudinal Stability - The short period dynamic oscillation of normal acceleration produced by moving and quickly releasing the elevator control shall be damped to 1/10 amplitude in one cycle."

Deviation: The specified number of cycles to damp may be exceeded provided that the oscillations are definitely stable and the degree of damping is satisfactory to WADC. If a device is used to provide the desired damping, it shall be required that no dangerous oscillations can occur under any circumstances without such damping device.

Reason for Change and Remarks: As already demonstrated on the YF-102 in flight, it is not necessary to meet the specified damping from the flight safety standpoint. The pitch damper will normally be operative.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B
156	3.3.2.1	Stability and Control

Requirement: Paragraph 4.2.1 - "The airplane shall possess positive static stick-fixed and stick-free longitudinal stability at all normal service loadings when flying with constant throttle setting under the conditions of Table II... if the curve of the variation of stick force with air speed below the trim speed does not cross the zero force axis and a pull force is required to reduce the speed from trim."

Deviation: (a) Elevator-Fixed Static Stability - Applicable except that at a Mach number above 0.85 with the airplane trimmed at a Mach number of 0.85, the variation of elevator deflection with Mach number may be negative, provided it is mild and not seriously objectionable to the pilot.

(b) Elevator-Free Static Stability - When trimmed under the conditions specified in Table II the variation of longitudinal control force with speed shall be a smooth curve with a stable gradient over a speed range of 50 knots(true speed)above and below trim. If a reversal in slope occurs above or below this speed range the change of control force with speed shall be mild and not seriously objectionable to the pilot.

Reason for Change and Remarks: (a) A mild instability of elevator angle will occur at transonic speeds which is caused by an aft movement of the center of pressure with constant or decreasing control effectiveness. This effect is considered not to be a hindrance to the flying qualities because the variation of longitudinal control force with speed shall be a smooth stable curve.

(b) The original specification requirements are not applicable to an airplane flying through ... transonic speed range with a power control system.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENT

Deviation Paragraph AAF Specification No. 1815 B (Cont)

157 3.3.2.1 Stability and Control

Requirement: Paragraph 4.3.2 - "When the airplane is trimmed at any permissible speed, it shall be possible by use of the elevator alone to develop, at the trim speed, the maximum positive or negative lift coefficient or positive or negative limit load factor, whichever is reached first This requirement shall apply to all of the configurations listed in paragraph 2.2 with the exception of configuration WO."

Deviation: Applicable, except as limited by angle of attack corresponding to a $C_L = 0.75$ at stall speed, maximum available elevator deflection or maximum limit load factor. The stalling speed used for performance estimates or guarantees (if any) shall be consistent with this definition.

Reason for Change and Remarks: An arbitrary angle of attack has to be selected and elevator control power be made consistent with an optimum power control system in order that undue weight penalties do not occur.

* * * *

158 3.3.2.1 Stability and Control

Requirement: Paragraph 5.1.1 - "The damping of the lateral-directional oscillation with controls fixed and free shall be positive and shall be such that the time to damp to one-half amplitude, and the period shall fall within the satisfactory area of the chart given in Figure 1."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   AAF Specification No. 1815B (Cont)

158 (Cont)   3.3.2.1   Stability and Control (Cont)

Deviation: Artificial damping devices may be used to meet the requirements of R-1815B.

Reason for Change and Remarks: Artificial damping devices will be required to meet the requirements of R-1815B.

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159   3.3.2.1   Stability and Control

Requirement: Paragraph 6.3.4 - "In rolls from straight or turning flight under the specified conditions at 10,000 feet altitude, with the rudder held fixed in the position required for steady flight prior to the roll, the ailerons or other lateral control device shall be sufficiently powerful to produce the peak rolling rates corresponding to the values given in Table V."

Deviation: Available roll rates above Vmax (normal rated power) shall be subject to approval by WADC.

Reason for Change and Remarks: Additional flight investigations are required to establish the roll rates.

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160   3.3.2.1   Stability and Control

Requirement: Paragraph 7.1.1 - "The complete stall is considered to be the condition associated with breakdown of the airflow over the wing, and occurring immediately after the overall trimmed lift coefficient of the airplane reaches its

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
160 (Cont)	3.3.2.1	Stability and Control (Cont)

maximum value, except that this maximum shall not be set by limitations of available longitudinal control power. The complete stall is generally characterized by the following changes in the flying characteristics of the airplane:

(a) In straight flight, the airplane experiences one or more of the following: An abrupt downward pitching of the nose, or an abrupt dropping of the wing and the air speed reaches a minimum.

(b) In turning flight, the normal acceleration decreases markedly or the airplane rolls markedly.

Deviation: For purposes of stalling characteristics demonstration only, the stall shall be considered to be identified by full up elevator deflection.

Reason for Change and Remarks: There is no definite stall point as on conventional aircraft.

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161 3.3.2.1 Stability and Control

Requirement: Paragraph 8.1.1 - "The control system should be capable of moving the control surfaces at rates up to 35 degrees per second for Class I and II airplanes and 50 degrees per second for Class III and IV airplanes under any aerodynamic hinge moments encountered."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
161 (Cont)	3.3.2.1	Stability and Control (Cont)

Deviation: The ability of the airplane to perform the maneuvers expected of it shall not be limited significantly by the rates of the control surface deflection. In order that this condition be fulfilled, it is required that the rates of control surface displacement, under any flight condition, shall reach and remain within +10% of the final (short period) value in a time not more than 10% greater than the time associated with an assumed instantaneous control surface displacement of the same given value.

Reason for Change and Remarks: This deviation is consistant with design and weight penalties.

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162	3.3.2.1	Stability and Control

Requirement: Paragraph 8.1.2 - "When the cockpit control is moved at its maximum rate to a given deflection, the control surface shall reach its corresponding deflection with a time lag not greater than 0.05 second."

Deviation: The equivalent first order time constant for the power control system shall be no greater than 0.1 sec.

Reason for Change and Remarks: Lags not compatible with specification requirements for the slower surface rates will be sufficiently small that the control characteristics will be satisfactory.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
163	3.10.1	Primary Flight Control System

Requirement: Paragraph 8.1.3 - "The dead spots in the controls should not exceed ±0.1 inch motion of the pilot's cockpit controls.

Deviation: The dead spots in the controls shall not exceed ±0.2 inch motion of the pilot's cockpit controls.

Reason for Change and Remarks: The function design requirements of the airplane will not permit a simplified routing of the system to meet this requirement.

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Deviation	Paragraph	AAF Specification No. 1815B (Cont)
164	3.3.2.1	Stability and Control

Requirement: Paragraph 8.4.1 - "For airplanes having two or more completely independent equivalent power control systems, the requirements of paragraph 8.3.1 shall be met during the period of transfer from one system to another. Paragraphs 8 3.2, 8.3.3, and 8.3.4 do not apply to these airplanes."

Deviation: Applicable except that each system shall be capable of providing approximately half of the design hinge moment Both systems shall be in operation under normal conditions.

Reason for Change and Remarks: To enable use of independent dual systems.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1816, Dated 15 June 1945 - Spinning Requirements for Airplanes
165	3.3	Aerodynamics

Requirement: Paragraph B-1 - "This specification covers the spinning requirements of airplanes."

Deviation: The requirements of this specification shall be applicable to this airplane if it can be shown that spins may be encountered

Reason for Change and Remarks: Available data indicate that the airplane may be spinproof.

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Deviation	Paragraph	
166	3.3	Aerodynamics

Requirement: Paragraph D-3a - References paragraph D-2a which specifies "a one-hour spin test flight."

Deviation: One-half hour spin test flight

Reason for Change and Remarks: To conform with airplane endurance and the intent of the specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AF Specification No. 40149, Dated 2 September 1947, Check List; Air Crew Operation
167	3.19.2.3	Check List

Requirement: Paragraph E-1b (2)a - "The material with which the content is printed on the plate shall be a phosphorescent substance having a peak brightness of at least 100 microlamberts when measured in accordance with provisions of Specification No. AN-L-1 It shall have a phosphorescent value of at least 15% of its peak brightness 30 seconds after removal from the source of excitation and at least 3% of its peak brightness 2 minutes after its removal from the source of excitation "

Deviation: The check-off list shall be illuminated according to Specification No. MIL-P-7788.

Reason for Change and Remarks: For uniformity and ease of servicing, all lighting in the cockpit is red light. There is no ultraviolet light provision in the cockpit.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C Dated 15 December 1947, Anti-Icing Equipment for Aircraft (Heated Surface Type), General Specifications for
168	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-1e. - "Antenna masts, pitot tubes, radar vanes and airfoils, and other structures of similar nature which project into the air stream so as to be exposed to and adversely affected by ice accumulations shall be protected by the anti-icing system."

Deviation: Applicable, except that the radome will be protected by a freezing point suppressant liquid spray.

Reason for Change and Remarks: Freezing point suppressant liquid spray system recommended by WADC Components System Laboratory.

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Deviation	Paragraph	
169	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-2a - "The anti-icing system shall provide protection against an icing condition' . . . and wherein the size of the water droplets is not less than 15 microns in diameter."

Deviation: The anti-icing system shall provide protection against an icing condition . . . and wherein, the mean effective cloud droplet diameter is not less than 15 microns.

Reason for Change and Remarks: The accepted method of designing for the protection of aircraft against ice is based on a mean effective cloud droplet diameter rather than a minimum diameter.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
170	3.20.2.1	Anti-Icing of Non transparent Areas

Requirement: Paragraph D-3, - "No aircraft structural members shall be heated to more than 200 F."

Deviation: It shall be permissible for aircraft structural members to be heated to more than 200 F.

Reason for Change and Remarks: Allowance for strength reduction due to high temperatures will be made.

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Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
171	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-5, - "The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than five degrees Fahrenheit after two hours of operation."

Deviation: The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than 5 F during the length of time that the anti-icing system may be in operation.

Reason for Change and Remarks: The flight time under icing conditions will be much less than two hours.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviations	Paragraph	AAF Specification No. 40395-C (Cont)
172	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-8a - "The anti-icing system shall be capable of distributing heat to remove frost and ice from the wing and empennage surfaces when the airplane is at rest on the ground at all ambient temperatures down to -65°F

Deviation: Not applicable.

Reason for Change and Remarks: Wing and empennage surfaces have anti-icing space and structural provisions only.

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Deviations	Paragraph	AAF Specification No. 40395-C (Cont)
173	3.20 2 1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-9 - "The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, dated 9 January 1946."

Deviation: The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, dated 9 January 1946, or other authoritative literature.

Reason for Change and Remarks: There is authoritative literature which is more up to date and more realistic with respect to predicating water catch, water load profiles, and heat requirements.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-5072, Dated 6 April 1949 - Instrument Systems; Pitot Satic Tube Operated, Installation of
174	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.6 - Connecting Lines - "The pitot and static pressure lines connecting the pitot and static tubes to the instruments shall conform to Specification WW-T-787, anodized in accordance with Specification AN-QQ-A-696, and shall be 1/4 inch outside diameter and 0.032 inch wall thickness."

Deviation: Pitot and static pressure lines in the radome area shall be 1/4 inch outside diameter and 0.035 inch wall thickness and shall be nylon. (Polymer Corp #FM 10,000 or equivalent), as approved by WADC, prior to installation.

Reason for Change and Remarks. To eliminate electronic radar interference by the installation of suitable nonmetallic lines in the radome area.

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Deviation	Paragraph	
175	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.7 - Connecting Fittings - "Connecting fittings used throughout the installation of pitot-static instrument systems shall conform to Air Force-Navy Aeronautical Standards."

Deviation: Quick disconnect type fittings may be installed in lines to facilitate removal of quick detachable radome

Reason for Change and Remarks: To comply with requirements of Hughes Aircraft Corp specification covering fire control system of quick disconnect radome

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-I-5072 (Cont)
176	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.15 - "When specified, an alternate source of static pressure for each pitot-static tube shall be provided by installing a static pressure selector valve conforming to Drawing AN5831 . ."

Deviation: An alternate source of static pressure shall not be required

Reason for Change and Remarks: It is anticipated that special means with respect to static sources will have to be taken to meet the requirements for instrumentation and fire control equipment The Contractor proposes to satisfy these particular requirements.

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Deviation	Paragraph	Military Specification MIL-I-5072 (Cont)
177	3.14.3	Instrument Installation

Requirement: Paragraph 4 3 3.4.3 - "The air speed and altitude indication errors due to the location of the pitot-static tube, corrected to standard sea level conditions, shall not exceed the limits specified in Table 1 when tested in flight."

Deviation: In the transonic and supersonic speeds the Contractor will attempt to obtain the maximum accuracy possible using latest techniques.

Reason for Change and Remarks: The available equipment is not expected to yield the specified accuracies at transonic speeds.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-W-5088, Dated 14 March 1951 Wiring; Aircraft, Installation of
178	3.16.5	Wiring

Requirement: Paragraph 3.2.2.1 - "Insulating tubing for temperatures less than 93.3°C (200°F) shall conform to Specification JAN-I-631."

Deviation: It shall be permissible to use nylon insulating tubing. Where temperature of 93.3°C (200°F) is exceeded only during high speed operation, high temperature sleeving shall not be required.

Reason for Change and Remarks: Nylon insulating tubing is more suitable for use on this airplane since it will withstand Pratt and Whitney Engine Oil (Specification 521A) which is known to be detrimental to vinyl tubing, and has much better abrasive characteristics. Short duration of high temperature operation does not warrant the additional weight and cost. High temperature insulating tubing will be used wherever there is any possibility of damage due to excessive temperature.

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Deviation	Paragraph	
179	3.16.5	Wiring

Requirement: Paragraph 3.5.1.1 - For applications under 600V, cables shall be in accordance with Specification MIL-W-5086, MIL-W-7072, and MIL-C-7078. When specified by the procuring service cables in accordance with MIL-W-5274 (USAF) shall be used.

Deviation: (1.) In addition to the above, cable in accordance with MIL-W-5274 (USAF) may be used for wire sizes AN-12 and smaller. For wire sizes AN-10 and larger cable in accordance with CVAC Specification ZM-340-012 may be used.

CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Specification MIL-W-5088 (Cont)
179 (Cont)	3.16.5	Wiring (Cont)

(2.) Special cable may be used subject to the approval of the procuring agency.

Reason for Change and Remarks: (1.) Use of MIL-W-5274 (USAF) cable was requested by WADC - Cable in accordance with ZM-340-012 meets the requirements of MIL-W-5274 (USAF) for larger sizes not specified therein.

(2.) To permit the contractor to use cable best suited for particular application.

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180 3.16.5 Wiring

Requirement: Paragraph 3 5.1.3 - "In areas where the cable temperature exceeds 100°C (212°F), cables specifically approved for high temperature use shall be installed."

Deviation: Where a temperature of 100 C (212°F) is exceeded only during high speed operation, high temperature wire shall not be required. High temperature wire shall be used where temperatures exceed 250°F for periods of 5 minutes or longer.

Reason for Change and Remarks: Short duration of high temperature operation does not warrant the additional weight and cost. High temperature wire will be used wherever there is any possibility of damage due to excessive temperature.

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CONFIDENTIAL

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Specification MIL-W-5088 (Cont)
181	3.16.5	Wiring

Requirement: Paragraph 3.5.1.4 Coaxial cables suitable for the application shall conform to Specification JAN-C-17.

Deviation: Coaxial cable need not conform to JAN-C-17 but shall be approved by the procuring agency

Reason for Change and Remarks: To use the coaxial cable best suited to the application and to take advantage of the reduced weight of newer coaxial cable.

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Deviation	Paragraph	
182	3.17 & 3.16.5	Electronics Wiring

Requirement: Paragraph 3.5.2.3 - "When approved by the Procuring Service, cable size AN-22 may be used, provided that precautions are taken to prevent failure due to vibration and handling.

Deviation: Cable size AN-22 may be used for all inter-unit and inter-area electrical and electronic wiring where current carrying capacity and strength do not dictate use of larger conductor sizes.

Reason for Change and Remarks: Due to the large number of wires required and limited space available in the aircraft, a substantial improvement in size and weight of harness may be realized by substitution of the AN-22 cable for larger cables wherever possible.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Specification MIL-W-5088 (Cont)
183	3.16.5	Wiring

Requirement: Paragraph 3.6.1.1 - Exposed Junctions - Exposed junctions and buses shall be protected with insulating materials. Junctions and buses located within enclosed areas containing only electrical and electronic equipment are not considered exposed

Deviation: Covers over electrical and radio equipment (Terminal strips etc) shall not be required in locations where structure provides sufficient protection.

Reason for Change and Remarks: Covers not considered required where structure provides sufficient protection. This will result in a considerable weight saving in the airplane.

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Deviation	Paragraph	
184	3.16.5	Wiring

Requirement: Paragraph 3.6.6.1 - "Connectors in engine nacelles, areas of high vibration (excluding those on shock-mounted equipment) and in locations not readily available for inspection in flight shall have the coupling nut safety-wired to prevent opening of the connector due to vibration

Deviation: "UG" type connectors in particular, and other bayonet type connectors with no threaded coupling nut, subject to approval of the Procuring Service need not be safety wired.

Reason for Change and Remarks: Bayonet type connectors have a locking notch and one properly connected are not subject to opening due to vibration. These connectors are designed to the requirements of MIL-C-3608 which does not provide for safety wiring

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Specification MIL-W-5088 (Cont)
185	3.16.10 2	Electrical Connectors

Requirement: Paragraph 3.6.6.4 - "Connectors for general aircraft wiring shall be in accordance with Specification No. MIL-C-5015."

Deviation: (1) Plugs suitable for potting designed in general accordance with BuAer Drawing 54A3A225 (except that resilient inserts shall be specified) and receptacles meeting the same requirements except designed in accordance with AN-3100 or AN-3102 may be used in areas where the ambient temperature does not exceed 225 F.

(2) A minimum number of other nonapproved type connectors may be used where necessary, subject to the approval of the Procuring Agency.

Reason for Change and Remarks: (1) To insure a more environment free installation and to reduce weight.

(2) To permit the Contractor to make use of the best possible design from servicing and weight standpoint

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186	3.16.5	Wiring

Requirement: Paragraph 3.6.6.4 1 - Transparent insulating tubing or other approved material shall be placed over each cable terminal connection in both plugs and receptacles.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation — Paragraph — MIL-Specification MIL-W-5088 (Cont)

186 (Cont) — 3.16.5 — Wiring (Cont)

Deviation: Insulating tubing shall not be required when either "potted" or "E" type connectors are used.

Reason for Change and Remarks: This requirement is not applicable when "potted" or "E" type connectors are used.

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187 — 3.16.5 — Wiring

Requirement: Paragraph 3.6 6.4.2 Adapters 1 -"Open wiring attached to connectors shall be supported by AN3057 Adapters and AN3420 Bushings or to an assembly consisting of a maximum length of six inches of insulating tubing, a set of approved ferrules, etc."

Deviation: (1) It shall be permissible to use Coast Pro-Seal Mfg. Div. No. E P. 601-P compound or Minn. Mining No. E.C. No, 1120 P C. compound as a "fill" and support in lieu of clamps or adapters where the Contractor deems it practicable.

(2) Where adapters are used it shall be permissible to use bushings designed to AN3420A except that the material shall be suitable for use in areas subject to pollution by engine oil.

Reason for Change and Remarks: (1) Potting compound provides a more suitable method of sealing connectors against moisture and foreign particles. Also, it is a large weight savings.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph MIL-Spec MIL-W-5088 (Cont)

187 (Cont) 3.16.5 Wiring (Cont)

(2) The material specified for AN3420A bushings is not suitable for use where it may be subjected to contamination by MIL-L-7808 P and W engine oil No. 521A.

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188 3.16.5 Wiring

Requirement: Paragraph 3.6.6.4.3 - "Special purpose connectors - Where installation conditions require pressurized sealed, vibration-resistant, flame-barrier, fireproof, or waterproof connectors, suitable special purpose connectors in accordance with Specification No. MIL-C-5015 shall be used "

Deviation: A minimum number of nonapproved type connectors may be used where necessary, subject to the approval of the Procuring Agency.

Reason for Change and Remarks: This will permit the Contractor to make the best possible design from servicing standpoint

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189 3.16.10.2 Electrical Connectors

Requirement: Paragraph 3.6.6.5 - Connectors for coaxial cables shall be in accordance with Specification JAN-C-71.

Deviation: Connectors for coaxial cable shall be suitable for use with the coaxial cable used and shall be approved by the procuring service.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Specification MIL-W-5088 (Cont)
189 (Cont)	3.16.10.2	Electrical Connectors (Cont)

Reason for Change and Remarks: Connectors in accordance with Specification JAN-C-71 are for use with coaxial cable in accordance with JAN-C-17 Since other types of coaxial cable will be used suitable connectors must be permitted.

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Deviation	Paragraph	MIL-Specification MIL-W-5088 (Cont)
190	3.16.5	Wiring

Requirement: Paragraph 3.6.7 - Splices shall be covered with transparent insulating tubing extending at least 1/2 inch over each end, providing it is a snug fit, and it will be secured in place. Splices shall be staggered to prevent shorts due to puncturing the insulation and to prevent excessive enlargement of the bundle.

Deviation: The above requirement will be complied with where disconnect splices are used. Where preinsulated permanent splices are used the sleeving may be omitted. The installation with respect to sleeving and staggering shall be subject to approval of the CTCI Board.

Reason for Change and Remarks: Sleeving and staggering are not necessary where nylon preinsulated permanent splices are used.

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Deviation	Paragraph	MIL-Specification MIL-W-5088 (Cont)
191	3.16.5	Wiring

Requirement: Paragraph 3.6.7.1 - Permanent splices shall not be used for salvaging short lengths of cable.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Specification MIL-W-5088 (Cont)
191 (Cont)	3.16.5	Wiring (Cont)

Deviation: It shall be permissible to connect potted connectors by means of permanent splices.

Reason for Change and Remarks: To facilitate fabrication and to provide for use of spare conductors where used in potted connectors

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192	3 16.5	Wiring

Requirement: Paragraph 3.7,3 - "Cable groups shall contain no more than 26 cables, except as provided in paragraph 3.7.3.2."

Deviation: It shall be permissible to install cable groups with more than 26 cables, provided, however, that such cable groups shall be kept to a minimum and shall be used only where such cable groups are required to go through congested areas.

Reason for Change and Remarks: The size of the airplane and the large number of cables required make it impossible to meet this requirement in all cases.

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193	3.16.5	Wiring

Requirement: Paragraph 3.7.3.2 - Connectors - Wiring to connectors having more than 26 terminals may be run as single group provided all the wiring is pertinent to a single item of equipment.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation — Paragraph — MIL Specification MIL-W-5088 (Cont)

193 (Cont) — 3.16.5 — Wiring (Cont)

Deviation: It shall be permissible to install more than 26 wires in a single connector not pertaining to a single item or equipment.

Reason for Change and Remarks: The size of the airplane and the large number of wires make it impossible to meet this requirement in all cases, and will permit the contractor to make the best possible design from the servicing standpoint.

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194 — 3.16.5 — Wiring

Requirement: Paragraph 3.7.3.3 - "Equipment - Cable groups containing more than 15 cables which pertain to a single item of equipment shall be separated from other cable groups.

Deviation: It shall be permissible to install cable group with more than 15 cables pertaining to single item of equipment with other cable groups, however, such cable groups shall be held to a minimum.

Reason for Change and Remarks: The size of the airplane and the large number of cables to be installed make it impossible to meet this requirement in all cases.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Specification MIL-W-5088 (Cont)
195	3.16.5	Wiring

Requirement: Paragraph 3.7 3.4 - Cables of the primary electrical power system shall not be bundled or grouped with distribution circuit cables Cables for each power source shall not be in the same bundle or group to prevent damage affecting more than one power source.

Deviation: It shall be permissible to deviate from the above requirements in areas which are so congested as to prevent compliance Such installations shall be kept to an absolute minimum and approved by WADC.

Reason for Change and Remarks: The size of the airplane and the large number of cables to be installed make it impossible to meet this requirement in all cases.

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Deviation	Paragraph	
196	3.16.5	Wiring

Requirement: Paragraph 3.7.3 5 - Essential Equipment - Cables to each equipment which must operate to maintain flight of the aircraft under normal or emergency conditions shall be separately routed from other cables.

Deviation: Not applicable.

Reason for Change and Remarks: The Contractor considers there are no circuits that are classified as essential for maintaining normal or emergency flight of this aircraft.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Specification MIL-W-5088 (Cont)
197	3.16.5	Wiring

Requirement: Paragraph 3.7.3.7- Inspection and Maintenance - As a design objective, cable groups shall be installed to permit replacement of individual cables without removal of the group and to permit replacement of the group without removal of the bundle.

Deviation: It shall be permissible to put a maximum of four shields into a common terminal which will prevent removal of individual wires.

Reason for Change and Remarks: Use of individual terminals for each shield would require the addition of a considerable number of terminals and grounds.

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198	3.16.5	Wiring

Requirement: Paragraph 3.7.3.7.2 - Cable groups shall be installed in the form of quickly removable and replaceable harnesses, attachable and detachable from the adjacent harnesses and so located and supported to the structure that maintenance time is reduced to a minimum. As an installation objective, harnesses for a given installation shall be interchangeable in all models of the same series of aircraft. This installation may be accomplished by the use of disconnect splices, AN connectors, terminal blocks, or other approved means acceptable to the procuring service.

Deviation: Harnesses may be installed in the airplane and connected by means of permanent splices as authorized in paragraph

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Specification MIL-W-5088 (Cont)
198 (Cont)	3.16.5	Wiring (Cont)

3.6 7.1. Where this procedure prevents the removal of complete harnesses the requirements of this paragraph shall be waived.

Reason for Change and Remarks: Use of disconnect splices may be impractical and a substantial weight saving will be achieved by eliminating other types of disconnects, which would be necessary to meet these requirements.

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199 3.16.5 Wiring

Requirement: Paragraph 3 7.4.3 - Where cables are dressed downward to a connector, a trap or drip loop shall be provided to prevent fluids or condensate from running into above devices.

Deviation: Drip loops shall not be required with potted or "E" type connectors.

Reason for Change and Remarks: These connectors are waterproof and the requirement is not applicable.

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200 3.16.5 Wiring

Requirement: Paragraph 3.8.1 Support Devices - Devices used for supporting cable shall be of an approved type which are

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph MIL-Specification MIL-W-5088 (Cont)

200 (Cont) 3.16.5 Wiring (Cont)

replaceable by AN742 cushion clamp, AN931 grommets, MIL-T-6841 tape, MIL-C-5649 cord, or other approved devices.

Deviation: It shall be permissible to use nylon cable clamps, grommets, tape and cord, where wire in accordance with MIL-W-5274 or MIL-W-5086 or special application wires which are otherwise approved by AMC are used.

Reason for Change and Remarks: Nylon cable clamps, grommets, tape and cord are more suitable for use on this airplane since they will withstand Pratt & Whitney engine oil (Specification 521A MIL-C-7808 which is known to be detrimental to vinyl and rubber, also nylon has better abrasive characteristics. Nylon clamps are considerably lighter than AN 742 cushion clamps. (Ref. AMC MCPPAF-6 (WCSF-6) AGA/ch dated 24 August 1953.)

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201 3.16.5 Wiring

Requirement: Paragraph 3.10.1.2 - Flexible - Flexible metallic conduit conforming to Specification MIL-C-6136 shall be used only when the use of rigid metallic conduit is impracticable

Deviation: It shall be permissible to install extra flexible conduit on the armament displacing gear. Conduit shall be approved by WADC.

Reason for Change and Remarks: Standard circuit is not suitable for use in this application.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Specification MIL-W-5088 (Cont)
202	3.16.5	Wiring

Requirement: Paragraph 3.11.1.2 - "Master diagrams shall be substantially in accordance with Drawing No. 45L6937, and may be on multiple sheets or in book form in accordance with Specification No. MIL-H-5473."

Deviation: Master diagrams shall be on individual sheets in accordance with Specification No. MIL-H-5473, except that no internal diagrams shall be required.

Reason for Change and Remarks: Internal diagrams will be included on the schematics and to include them on the circuit diagrams would be a duplication adding unnecessary work

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203	3.16.5	Wiring

Requirement: Paragraph 3.11.2 - "Practical diagrams - For all Air Force requirement, and when required by the Navy, practical wiring diagrams shall be placed on junction box covers or adjacent to junction centers, etc."

Deviation: Practical wiring diagrams will not be installed in the aircraft.

Reason for Change and Remarks: As adequate space is not available in desired locations, stowage of the prints in a less desirable location would be unsatisfactory due to damage caused by fluids and heat. As approximately 140 diagrams are required a considerable weight savings will result from this deletion. Circuit wiring and schematic diagrams will be contained in the airplane erection and maintenance manual.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-H-5440, dtd 9 June 1950 - Hydraulic Systems; Design, Installation and Test of Aircraft
204	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.5 4 - "Disengagement and By-Passing - Provisions shall be made in the design of power-boosted and power-operated surface control systems for disengaging the actuator in the event of failure or jamming of the actuator, control valve or connecting linkages. Provisions need not be made for re-engaging in flight. Provisions shall be made for automatically by-passing, where necessary, the fluid from one side of the actuator to the other in the event of a power system failure. In addition, provisions shall also be made for temporarily by-passing the fluid from one side of the actuator to the other during periods when it is desired to operate surface controls manually with the hydraulic pressure turned off and the actuator disengaged."

Deviation: Disengagement and by-passing will not be required.

Reason for Change and Remarks: This is not considered applicable to a full-power control system.

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205	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.14 - "Gages - Pressure gages in accordance with the applicable specifications listed in Section 2 shall be provided to indicate the system pressure in the hydraulic system or subsystems where necessary."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification MIL-H-5440 (Cont)

205 (Cont) 3.15.1.1 Hydraulic System (Cont)

Deviation: Remote reading indicators may be used.

Reason for Change and Remarks: To eliminate the routing of high pressure hydraulic lines within the cockpit area.

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206 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.25.4 - "Normal ground-servicing, fluid-level range shall be indicated with the accumulator or accumulators completely discharged of oil pressure and another level range to indicate the safe operating limit with accumulators charged to normal air and oil pressure."

Deviation: Indication of fluid level range, with accumulators filled with oil, is not required.

Reason for Change and Remarks: It is not practical to fill the reservoir with the system in operation and accumulators filled with oil.

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207 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.25.5 - "The reservoir pressure shall be controlled by an external, nonadjustable pressure regulating device set to 12 psig (26.7 psi) absolute which shall be connected to the air space above the oil level in the reservoir to protect the reservoir from rupturing....."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Specification No. MIL-H-5440 (Cont)
207 (Cont)	3.15.1.1	Hydraulic System (Cont)

Deviation: Pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of hydraulic pumps.

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208	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.29.3 - "The pressure drop from the reservoir to the pump intake port....shall be such that the pressure at the inlet port will not be less than 14 inches of mercury absolute nor more than 12 psig (26.7 psia)."

Deviation: Applicable, except as modified in deviation to paragraph 3.8.25.5 of MIL-H-5440.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-D-5481 Dated 13 December 1949 Drawings and Data Lists; Preparation of (For Production Aircraft)
209	Requirement:	Paragraph E-3a - "A general arrangement (complete assembly) drawing, drawings of all necessary assemblies and subassemblies, and separate detail drawings shall be made for all parts of the aircraft (except as specifically exempted herein). Figure 4 shows the installation and major assembly drawings required for conventional aircraft design. If any of the drawings listed in Figure 4 are not applicable to the specific aircraft design, applicable installation and major assembly drawings shall be substituted." Paragraph E-3d - "Assembly Drawings - The assembly drawings for such items as wing panels, wing tips, rudder, stabilizers, etc., shall be complete units containing all necessary electrical, hydraulic, and fuel systems, etc., already installed, and shall clearly indicate that these installations are included as part of the assembly to which they pertain. Thus, the wing panel assembly drawing may be an outline drawing only, calling out the separate drawings covering the installation of the wing panel hydraulic system, electrical system, detail wing structure assembly, etc., as subassembly drawings."
	Deviation:	In lieu of a single airplane general assembly drawing the aircraft shall be defined by four top general arrangement or assembly drawings as noted below. All electrical, electronic instrument and instrumentation equipment, harness, installations, etc., not included as part of the basic structure shall be excluded from the major component assembly drawings. All electrical, electronic, instrument, and instrumentation items shall next assemble into their applicable general assembly drawings.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Specification MIL-D-5481 (Cont)
209 (Cont)		Airplane General Assembly Instrumentation General Assembly Electronic General Assembly Electrical & Instrumentation General Assembly

It shall be permissible to issue "typewriter" drawings to define major assembly spares.

Reason for Change and Remarks: The extensive and accelerated test programs established for these airplanes will necessitate numerous changes in each airplane, or small blocks of airplanes, to accomplish the end tests. From an analysis, these items subject to change fall within the electrical, electronic, instrument and instrumentation categories. Changes in these categories could cause creation of a complete number breakdown, including major assembly, for each airplane. In order to expedite the program, maintain a record of each airplane, establish spares applicable to all (or a majority of) airplanes and reduce the task of number changing to a minimum the plan was evolved to separate the changeable categories from the basic airplane. To provide for major assembly spares useable on all (or a majority of) airplanes, a series of spares (typewriter) drawings would be established which would contain the necessary provisions to permit maximum usage.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-C-5503A, Dated 7 April 1950 Cylinders; Aircraft, Hydraulic Actuating
210	3.8	Alighting Gear

Requirement: Paragraph 4.5.7 - Extreme Temperature Performance (Testing methods described under paragraphs 4.5.7, 4.5.7.1, 4.5.7.2, and 4.5.7.3).

Deviation: Extreme temperature testing of landing gear actuating cylinders shall be performed on entire landing gear strut assembly to that requirement.

Reason for Change and Remarks: Testing of actuating cylinders separately would be duplicate testing. (See Convair Ltr 6-1638 dated 16 April 1953 and AMC Mtr MCPPAF-6 (WCOWF-6 RGA/ah dated 1 July 1953).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5514A, Dated 7 June 1950 - Packings; Installation and Gland Design of Aircraft Hydraulic and Pneumatic (General Specification for)
211	3.15.1.1	Hydraulic System - Description and Components

Requirement: Paragraph 1.1 - "This specification is drawn to establish basic design criteria covering use and application of packings, packing glands, and related features as used in hydraulic system equipment in accordance with Specification No. MIL-H-5440, using MIL-O-5606 hydraulic fluid, and in pneumatic system applications, in accordance with Specification No. MIL-P-5518."

Deviation: Applicable, except that special seals may be required for local high temperature conditions. Such special seals shall be submitted to WADC for specific approval for each kind of application.

Reason for Change and Remarks: The seals of Specification No. MIL-P-5514 are not suitable for high temperature use.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518, Dated 3 January 1950 - Pneumatic Systems; Design, Installation and Test of Aircraft
212	3.15.2	Pneumatic System

Requirement: Paragraph E-3b (2) - "Pneumatic units such as air bottles shall withstand a proof pressure equal to 200% of the system cut-out pressure."

Deviation: Proof pressure shall be 5/3 times the system cut-out pressure. (Reference Convair Specification No. 8-08359).

Reason for Change and Remarks: Air bottles will be nonshatterable and shall withstand gunfire test. Higher testing pressures should not be required.

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Deviation	Paragraph	
213	3.15.2	Pneumatic System

Requirement: Paragraph E-3c (2) - "Air bottles shall be capable of withstanding a burst pressure equal to 200% of the proof pressure."

Deviation: Burst pressure shall be 20/9 times the system cut-out pressure. (Reference Convair Specification 8-08359).

Reason for Change and Remarks: Air bottles will be nonshatterable and shall withstand gunfire test. Higher testing pressure should not be required.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518 (Cont)
214	3.15.2	Pneumatic System

Requirement: Paragraph E-4 - "The pneumatic system shall operate satisfactorily within the range of outside air temperatures and altitudes shown in Figure 1. Under none of these conditions shall the temperature of the air under main system pressure in the air bottles and the remainder of the pneumatic system after the air bottles, exceed 71°C (160°F) during system operation. In the event that units such as hoses and valves located ahead of the air bottles would be adversely affected by temperatures above 71°C (160°F) provisions shall be made to limit the temperature of 71°C (160°F) during system operation."

Deviation: Component temperatures may exceed 160°F.

Reason for Change and Remarks: Components will be subjected to temperatures above 160°F due to aerodynamic and engine heating. There is insufficient cooling to maintain temperatures of 160°F or lower. These components will be designed and tested to insure proper operation at the temperatures they are exposed to.

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Deviation	Paragraph	
215	3.15.2	Pneumatic System

Requirement: Paragraph E-9c, last sentence - "Aluminum alloy fittings shall not be used with stainless steel lines."

Deviation: It shall be permissible to use male threaded aluminum alloy fittings with stainless steel lines in sizes -8 and above.

Reason for Change and Remarks: This deviation, which will accomplish a maximum weight saving in design of the pneumatic system,

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-P-5518 (Cont)

215 (Cont) 3.15.2 Pneumatic System (Cont)

conforms with paragraph 3.9.10 of MIL-P-5518A dtd 3-26-53 (ref CVAC Ltr 6-1750 dtd 20 April 1954. Dev. approved by AMC Ltr MCPPAF-6 (WCSF-6) SSS/feb dtd 28 June 1954).

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216 3.15.2 Pneumatic System

Requirement Paragraph E-13a (1) - "The ground charging connection shall be installed in accordance with Drawing AND 10071.."

Deviation: Applicable, except that AND 10071 valve installation may be replaced by a valve permitting greater air flow.

Reason for Change and Remarks: To reduce ground charging time.

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217 3.15.2 Pneumatic System

Requirement: Paragraph E-22a (1) - "The use of all packings shall be as specified in Specification No. AN-P-74."

Deviation: Applicable, except that in special cases where friction forces are detrimental, other types of packings may be used subject to WADC approval.

Reason for Change and Remarks: Friction may be critical in certain valves.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518 (Cont)
218	3.15.2	Pneumatic System

Requirement: Paragraph E-25a - "Pressure gages AN5769 or AN5771, in accordance with Specification AN-G-2, shall be provided. . . ."

Deviation: Low Pressure Warning Light will be provided.

Reason for Change and Remarks: To simplify instrument panel and reduce weight and as approved by cockpit Mock-Up Board 28 July 1954.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-R-5520, Dated 3 January 1950 - Reservoirs; Hydraulic
219	3.15.1.1	Hydraulic System

Requirement: Paragraph E-1i (2) - "Where pressurized reservoirs are used, means shall be provided to limit internal pressures to a maximum of 12 pounds per square inch gage."

Deviation: Applicable, except that the pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps."

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-5842 (USAF) Dated 1 September 1950 - Transparent Areas; Anti-Icing, Defrosting and Defogging Systems, General Spec. for
220	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.2.2.1 - "The windshield shall be defined as the transparent area or areas which are intercepted by a line through the eyepoint of the pilot (or copilot) in the forward and forward oblique direction (approximately 45° to either side of straight ahead) and which are normally used in flying and landing the aircraft."

Deviation: The windshield shall be defined as the flat glass area which forms the "VEE" shape in front of the pilot.

Reason for Change and Remarks: It is planned to use an electrically conductive coating for anti-icing which can be used only on flat glass.

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Deviation	Paragraph	
221	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.3.1 - "All transparent areas essential to the mission...."

Deviation: The canopy transparent material will not be defrosted or defogged.

Reason for Change and Remarks: Defrosting and defogging protection is provided for the windshield in conformance with Specification MIL-T-5842. The decision as to defrosting and defogging the canopy will be made after completion of Category V studies of 28-29 July 1954 Mock-Up Board and its evaluation by WADC.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-5842 (USAF) (Cont)
222	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.6 - "A clear vision panel (one which is openable in flight under conditions of ice, frost and fog), or a section of transparent area maintained in a clear condition under conditions of ice, frost and fog, shall provide vision to the pilot in the event of failure of the normal defroster, defogging, or anti-icing system or systems."

Deviation: Emergency vision as defined in paragraph 3.6, 3.6.1, and 3.6.2 of Specification No. MIL-T-5842 will not be provided.

Reason for Change and Remarks: An openable panel is not considered practicable from the standpoint of clearance required and obstruction to pilot's vision due to framework required. The only space available for an additional clear transparent area is on the curved acrylic panels.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-I-5997 (USAF) Dated 31 January 1951, Instruments and Instrument Panels Aircraft, Installation of
223	3. 14. 3	Installation - Instruments
	3. 19. 2. 2	Panel- Installation

Requirement:

(1) Paragraph 3. 1. 2 - "The main instrument panel(s) shall be mounted normal to the longitudinal axis of the airplane."

(2) Finish - "The finish of the instrument panel shall be durable dull black."

(3) Paragraph 3. 2. 1 - "All instrument panels shall be mounted on vibration absorbers constructed in accordance with the requirements of Specification MIL-A-5840."

(4) Paragraph 3. 3. 4 - "The transmitters shall be mounted in a location where the temperature never exceeds 70°C."

Deviation:

(1) The instrument panel shall be mounted with a slope of 15° measured forward of the plane normal to the longitudinal axis of the airplane. The J-8 attitude gyro shall be normal to flight attitude of the airplane.

(2) The finish of the instrument panel shall be dark grey, Color No. 3520 of color Specification TT-C-595.

(3) Instrument panel shall not be mounted on vibration absorbers. Space provisions shall be made for vibration isolators and/or vibrators pending results of flight tests.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-I-5997 (USAF) (Cont)
223 (Cont)	3.14.3	Installation - Instruments (Cont)
	3.19.2.2	Panel - Installation

Deviation: (4) Instrument transmitters shall be mounted in compartments in which the temperatures shall not exceed 70°C for extended periods by may reach 120°C for periods not to exceed 15 minutes duration.

Reason for Change and Remarks: (1) To provide maximum visibility over the instrument panel, provide optimum visibility of the instruments on the panel and provide for the maximum number of instruments of the panel while maintaining the optimum location of the radar scope.

(2) Per Mock-Up Board meeting 28-29 July 1954, RFA No. 48.

(3) Experience with aircraft powered with gas turbines has indicated that the vibration transmitted to the instrument panel is within acceptable limits.

(4) It is not considered necessary to use special transmitters for high temperature operation since high temperature, if for a limited time only, will not cause the temperature of the units to rise sufficiently to cause damage.

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224	3.19.2.2	Instrument Panel

Requirement: Paragraph 3.3.5 - Maintenance - All instruments and connections thereto shall be accessible for replacement without removing other instruments or equipment.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-I-5997 (USAF) (Cont)
224 (Cont)	3.19.2.2	Instrument Panel (Cont)

Deviation: The requirements of the above paragraph need not be adhered to.

Reason for Change and Remarks: Plastic sandwich lighting of the instrument panel makes it impossible to meet the requirements of the above paragraph. Sandwich lighting was requested by the Procuring Agency at lighting Mock-Up.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-6051 dated 28 March 1950, Interference Limits and Methods of Measurement; Aircraft Radio and Electronic Installation
225	3.17	Electronics

Requirement: Paragraph 1.2.3.1 - "All electrical and electronic equipment included in the aircraft detail specification and changes thereto shall be installed in the aircraft and shall be in normal operating condition as determined by the test procedures and techniques specified by the Procuring Service.

Deviation: The MG-3 fire control will not be installed in aircraft serial numbers AF-53-1791 through AF53-1798 to comply with test procedures.

Reason for Change and Remarks: The MG-3 fire control system will not be available for installation prior to regular testing until aircraft serial number AF-53-1799.

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Deviation	Paragraph	
226	3.17	Electronics

Requirement: Complete Specification.

Deviation: During accelerated development test program isolation and correction will not be made to noise interference caused by test instrumentation or special configuration installed.

Reason for Change and Remarks: Time involved and cost would prohibit isolation and correction of noise interferences caused by the temporarily installed special test instrumentation.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053, dated 1 June 1950 - Tests; Landing Gear Shock Absorber Drop
227	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-7 - "The assembly of the shock absorber, wheel and tire shall be dropped freely and shall develop a vertical velocity of 12 feet per second upon ground contact. The necessary drop height is normally taken as 27 inches which shall be measured vertically from the position of the assembly when the tire is just contacting the ground or platform."

Deviation: The assembly of the shock absorber, wheel and tire shall be dropped freely and shall obtain the following contact velocity: (1) A contact velocity of 9 feet per second with 1W wing lift shall not exceed the established limit load factor at design landing weight.

(2) A contact velocity of 12 feet per second with 1W wing lift at design landing weight shall not fail the shock strut structure.

(3) A contact velocity of 5 feet per second shall be used to establish the limit load factor at design take-off weight. The 1W wing lift shall be considered in effect. The effective weight (W_e) must be correct for the velocity used. This test may be run in conjunction with the overload test specified in Paragraph F-15.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
227 (Cont)	3.8.2.4	Shock Absorbers - Main Landing Gear (Cont)
	3.8.4.4	Shock Abosrbers - Nose Landing Gear (Cont)

Reason for Change and Remarks: (1) To establish the limit load factor at the design landing weight.

(2) This test is to substantiate that the strut has sufficient energy absorption capacity for an extremely hard landing at design landing weight.

(3) This test is to substantiate that the strut has sufficient energy absorption capacity for an extremely hard landing at design take-off weight.

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228	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-8 - "Nose Wheel Type Airplane - The main landing gear and the auxiliary landing gear shall be dropped on a platform inclined at 18° and 16 minutes to the horizontal, to provide an aft component of load on the landing gear."

Deviation: The main landing gear and the auxiliary landing gear shall be dropped on a horizontal surface. The wheel shall be spun in the reverse direction when dropping on the stationary surface at a velocity corresponding to design landing speed. The rolling radius of the tire shall be considered to be moving at this velocity. The surface upon which the landing gear is dropped may be commercial finish steel plate, or equivalent. The moment of inertia of the rotating parts of the brakes shall be simulated for the drop test.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
228 (Cont)	3.8.2.4	Shock Absorbers - Main Landing Gear (Cont)
	3.8.4.4	Shock Absorbers - Nose Landing Gear (Cont)

Reason for Change and Remarks: To simulate actual airplane conditions and to establish test conditions. Use of rolling radius requested by WADC Letter WCSWF/NMR/nlt dated 16 October 1951.

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229	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-10 - "The total droppable weight in the jig is named the 'effective weight' and shall be determined by the following formula:

$$W_e = \frac{27W}{d + 27}$$

W_e = effective weight

W = 1/2 the stress analysis gross weight of the airplane for the main landing gear, or the static weight on the auxiliary gear.

d = The pneumatic throw on the tire plus full vertical axle travel. The pneumatic throw of the tire is the deflection of the specific tire under a dynamic load of (0.9N-1) W pounds. The value of "d" will normally be determined from tire load deflection curves furnished by tire manufacturers or the Procuring Agency. The pressure in the tires shall be that re-

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
229 (Cont)	3.8.2.4	Shock Absorbers - Main Landing Gear (Cont)
	3.8.4.4	Shock Absorbers - Nose Landing Gear (Cont)

required for proper inflation on the airplane with gross weight W. For main and tail tires, the tire pressure shall be that required for the static reaction on the tires with the airplane in the 3-point position. For the nose wheel, the tire pressure shall be that computed by the method given in Section II, Part V, Paragraph 73 of the Handbook of Instructions for Airplane Designers."

Deviation: Effective Weight - When separate means for supplying the 1W wing lift is provided, the total droppable weight in the jig shall be Wd. When separate means for supplying the 1W wing lift are not provided, the total droppable weight in the jig shall be reduced to an effective weight as determined by the following formula:

$$W_e = \frac{h\,W_e}{d + h'}$$

$$h' = \text{jig drop height} = \frac{(\text{Contact velocity} - V)^2}{2g}$$

where:

V = Area under acceleration vs time curve [acceleration = (L. F. -1)g] between time of contact and time of load factor equals one.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
229 (Cont)	3.8.2.4	Shock Absorbers - Main Landing Gear (Cont)
	3.8.4.4	Shock Absorbers - Nose Landing Gear (Cont)

W_e = Effective Weight - This value must be checked after a drop of "h" inches to insure that it is within 3% of the calculated value and corrected if necessary.

W_d = One-half of the design landing weight for the main gear or the static weight on the nose gear.

d = The pneumatic throw of the tire plus the estimated vertical axle travel. The pneumatic throw of the tire is the deflection of the specific tire under a dynamic load of Ng W pounds. The value of the pneumatic tire throw will be determined from tire load deflection curves furnished by the tire manufacturers or the Procuring Agency. The pressure in the tires and shock struts shall be that required for proper inflation on the airplane under maximum take-off gross weight. For the main gear tire, the tire pressure shall be that required for the static reaction with the airplane in the three-point position. The tire pressure for the nose wheel shall be that computed by the method given in Section 7 of Handbook of Instructions for Airplane Designers.

Reason for Change and Remarks: This deviation is required in order to be consistent with other deviations listed herein.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
230	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-10a - "A drop of 18 inches shall be made prior to making any test records. This is not necessary if the mass in the jig is tied to the basket."

Deviation: A drop of 12 inches shall be made prior to making any test records.

Reason for Change and Remarks: To be consistent with deviations listed herein.

* * * *

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
231	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-11 - "The maximum allowable load factor developed in the drop test shall not exceed the value given in the following formula;

$$N_j = \frac{(0.9N-1)W}{W_e}$$

N_j = jig load factor - acceleration $\left(\frac{dv}{dt}\right)$ in g's recorded in the jig + 1.

W = 1/2 design gross weight of the airplane for the main landing gear or static weight on the auxiliary gear.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053 (Cont)
231 (Cont)	3.8.2.4	Shock Absorbers - Main Landing Gear (Cont)
	3.8.4.4	Shock Absorbers - Nose Landing Gear (Cont)

N = Ultimate ground load factor as determined from the Procuring Agency's applicable specification.

W_e = Effective weight

Deviation: When separate means for supplying the 1W wing lift are provided, the maximum allowable load factor developed in the drop test shall not exceed Ng.

$$N_j = N_g$$

When separate means for supplying the 1W wing lift are not provided, the maximum allowable load factor developed in the drop test shall not exceed the value given in the following formula:

$$N_j = \frac{N_g W_d}{W_e}$$

N_j = jig load factor = acceleration $\left(\frac{dv}{dt}\right)$ in g's recorded in the jig + 1.

W_d = 1/2 design landing weight for the main gear or the static weight on the nose gear.

$N_g = n_a - 1$

n_a = airplane limit landing load factor

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviations	Paragraph	Military Specification No. MIL-T-6053 (Cont)
231 (Cont)	3.8.2.4	Shock Absorbers - Main Landing Gear (Cont)
	3.8.4.4	Shock Absorbers - Nose Landing Gear (Cont)

W_e = effective weight

Reason for Change and Remarks: To be consistent with application of 1W wing lift as specified in other deviations listed herein.

* * * *

232	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Paragraph F-14 - "Records shall be taken as direct readings from the test rig and shall be taken at intervals of three inches up to and including the maximum drop height of 27 inches."

Deviation: Direct Reading Records - Records shall be taken as direct readings from the test rig and shall be taken at intervals of three inches up to and including the drop height specified in Paragraph F-7, Item 1.

Reason for Change and Remarks: To be consistent with deviation listed in Item 1.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-6140 dated 27 April 1950 "Insignia National Aircraft"
233	3.2.7	Identification and Markings

Requirement: Paragraph D2a (2) "The insignia shall have a blue circle, excluding the border, with a maximum diameter of 60" and a minimum diameter of 30". Standard sizes shall have a blue circle diameters in multiples of 5". The blue circle diameter selected shall be the standard size which is closest to, but does not exceed 75% of the distance between the leading edge of the wing and the aileron cut out at the point of application."

Deviation: A blue circle of 40" diameter shall be used as specified on CVAC Drawing 8-90901.

Reason for Change and Remarks: Due to the Delta wing configuration, the Contractor arbitrarily chose a 40" diameter circle since it appears to be of adequate size and in keeping with the span of the wing. Approved by AMC ltr MCPPAF-6 (WCSF-6) dated 23 March 1954.

* * * *

Deviation	Paragraph	
234	3.2.7	Identification and Markings

Requirement: Paragraph D-2b (2), size - "the insignia shall have a blue circle, excluding the border, with a maximum diameter of 50" and a minimum diameter of 20". Standard sizes shall have a blue circle diameter in multiples of 5". The diameter selected shall be the standard size which comes nearest to, but does not exceed 75 % of the height of the projection of the fuselage or hull side of the point of application."

Deviation: The size and location of the national insignia on the fuselage shall be submitted to WADC for approval.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-6140 (Cont)
234 (Cont)	3.2.7	Identification and Markings (Cont)

Reason for Change and Remarks: It is impossible to comply with the above requirements due to the fuselage configuration, wing location, and to afford placement of the insignia in such a position that it could be viewed without distortion. Approved by AMC ltr MCPPAF-6 (WCSF-6) dated 23 March 1954.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-A-6224A, dated 25 September 1950 - Antenna for UHF Airborne Communications Equipment, General Specification for Design of
235	3.17.2.1.1	Radiation Pattern

Requirement: Paragraph 3.2.2.5 - "The antenna, when installed on an aircraft, shall receive and transmit a substantial amount of the total available energy as vertically polarized radiation within the zone between 30 degrees above and 30 degrees below the horizon. The azimuthal radiation patterns within the fore-going zone shall be free from deep null and sharp variations in gain."

Deviation: The azimuthal radiation patterns within more than 95% of the foregoing zone shall be free from deep nulls and sharp variations in gain.

Reason for Change and Remarks: Some deep nulls and sharp variations in gain are unavoidable consequences of the particular external configuration of this airplane and are therefore not controlable by the antenna design. Deep nulls and sharp variations in gain are defined as those variations in gain which drop to a value less than the gain of an isotropic radiator by at least 11 db.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A dated 18 January 1952 - Lighting Equipment, Aircraft Instrument Panel - General Specification for Installation of
236	3.16.8.2	Interior

Requirement: Paragraph 3.2.3.1 - The primary instrument lighting system shall consist of individual instrument lighting fixtures as specified by the Procuring Agency.

Paragraph 3.2.3.1.3 - Individual fixture for clamp mounted instruments. The fixture for the clamp mounted instruments shall be in accordance with Specification MIL-L-7581. Where instrument panel space prevents, the fixture shall be located above the top center of the instrument to be illuminated. In any event the fixture shall be located so as to permit the crew members, when seated in their normal positions, from seeing direct light from the fixtures, direct reflections of the light from the face of the instrument, or from the windshields. The final location shall be subject to the approval of the Procuring Agency.

Deviation: Sandwich type lighting of instruments may be used.

Reason for Change and Remarks: Sandwich type lighting of instruments requested by and approved by Mock-Up Board 7-8 April 1953, RFA #1.

* * * *

237	3.16.8.2	Interior

Requirement: Paragraph 3.2.3.2 - The secondary instrument lighting system shall consist of Type A-11 red floodlights conforming to Specification No. 32639.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A (Cont)
237 (Cont)	3.16.8.2	Interior (Cont)

Deviation: Type A-11 red floodlights need not be used for the secondary instrument lighting system.

Reason for Change and Remarks: The light distribution of the A-11 floodlight is not compatible with the requirements for adequate lighting of this cockpit configuration.

* * * *

238 3.16.8.2 Interior

Requirement: Paragraph 3.2.3.4 - Provisions shall be made for controlling the light intensity of the primary system separately from that of the secondary system. Furthermore, the light assemblies shall be grouped on intensity controls in such a manner as to permit the pilot and copilot to control the light intensity of his flight instrument group separately from that of his engine instrument group.

Deviation: Intensity control of instrument secondary lighting may be by only one control and need not be separately grouped as to flight instruments and engine instruments.

Reason for Change and Remarks: Configuration and Limited area of instrument panel are such that separation of secondary lighting per specification is impractical and entirely unnecessary as was demonstrated in the lighting mockups and accepted by the Mock-Up Board 7-8 April 1953.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-L-6423A (Cont)

239 3.16.8.2 Interior

Requirement: Paragraph 3.2.3.5 - The power for the primary and secondary instruments lighting systems shall be taken from an essential supply bus.

Deviation· The secondary lighting shall be supplied from the non-essential A. C. bus.

Reason for Change and Remarks: To stay within the requirements of the emergency A. C. generator. The output of this generator is limited by the hydraulic power during "Dead Stick" landing.

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240 3.16.8.2 Interior

Requirement: Paragraph 3.2.6 -. Dimming Controls - "Inclosed type rheostats in accordance with Spec. MIL-R-22 or MIL-R-6749 and Standard AN3155 shall be used as dimming controls for instrument lighting systems....."

Deviation: Variable voltage autotransformers may be used for dimming controls on lighting circuits supplied from A. C. sources.

Reason for Change and Remarks: Some instrument panel lights are to be operated from the A. C. bus to conserve battery power during emergency as approved by Cock-pit Mock-up Board 28 July 1954.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A (Cont)
241	3.16.8.2	Interior

Requirement: Paragraph 3.2.6.3 - Intensity Levels of Thunderstorm Lights - "The dimming controls for the thunderstorm lights shall provide a means for varying the voltage across the lamps from a maximum of approximately rated lamp voltage to 1/4 rated lamp voltage."

Deviation: Dimming shall not be provided.

Reason for Change and Remarks: RFA #66 - Cockpit mock-up board 28 - 29 July 1954.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (USAF) dated 5 July 1951 - Lighting Equipment: Aircraft, General Specification for Installation of
242	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.1 - Navigation Light System - "..... shall be electrically connected to the navigation light system as shown on Figure 1."

Deviation: The AN 3131-303 lamp called for fuselage lights may be omitted and equivalent dimming accomplished by use of tapped transformer, with similar treatment for dimming of the wing and tail lights in lieu of resistors.

Reason for Change and Remarks: Navigation lights will be energized by A.C. sources to conserve battery power during emergency and to save weight.

* * * *

Deviation	Paragraph	
243	3.16.8.3	Exterior Lights

Requirement. Paragraph 3.2.1.1.1 - Wing Position Light Assemblies - The wing position light assemblies shall be installed in accordance with Specification No. MIL-L-6730, etc. Light assemblies and associated equipment are included in Table I.

Deviation: Special lights may be installed as required and as approved by the Procuring Agency.

Reason for Change and Remarks; Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights. (Ref CVAC ltr 8-3686 dated 17 July 1952, Paragraph 3.2)

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviations	Paragraph	Military Specification No. MIL-L-6503 (Cont)
244	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.1.3 - Fuselage light assemblies shall be installed in accordance with Specification MIL-L-6730 etc. The assemblies shall be connected into the electrical circuit as shown on Figure 1.

Deviation; (1) Special lights may be installed as required and as approved by the procuring agency.

(2) The position lights shall be operated from the 115 volt A.C. essential bus through suitable transformers. Dimming shall be accomplished by use of appropriate taps on the transformer.

Reason for Change and Remarks: (1) Aerodynamic design considerations and the configuration of the wing, tail, and fuselage dictate the use of special exterior lights and circuitry. This installation was approved by WADC.

(2) To provide greater endurance for the D.C. emergency power source, the essential bus is energized, during emergency, by the hydraulic driven A.C. generator. To save wire, thus reducing weight.

* * * *

Deviations	Paragraph	Military Specification No. MIL-L-6503 (Cont)
245	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.3 Taxi Lights - "The part number of the taxi lamp assembly is shown in Table I."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (Cont)
245 (Cont)	3.16.8.3	Exterior Lights (Cont)

Deviation: Special light assembly suitable to the configuration of this airplane may be installed and shall be approved by the Procuring Agency.

Reason for Change and Remarks: Taxi light assemblies shown in Table I cannot be mounted satisfactorily in this airplane.

* * * *

246 3.16.8.2 Interior Lights

Requirement: Paragraph 3.2.2.1 - " A suitable map reading light shall be supplied."

Deviation: A map reading light shall not be supplied.

Reason for Change and Remarks: Instrument flood lights are suitable for this purpose. (As approved by cockpit Mock-Up board 28-29 July 1954.)

* * * *

247 3.16.8.2 Interior Lights

Requirement: Paragraph 3.2.2.2 - Control Panel Lighting - All aircraft equipped for night flying shall have the labels, information plates, marking and other necessary indications, which are required for the operation of the control panel equipment, illuminated by use of light assemblies in accordance with Drawing AN-3502 or other types of assemblies approved by the Procuring Agency in conjunction with plastic lighting plates in accordance with Specification AN-P-89.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (Cont)
247 (Cont)	3.16.8.2	Interior Lights (Cont)

Deviation: Secondary lighting, in addition to primary lighting, may be provided for lighting the console. Secondary lighting may be used for lighting the side circuit breaker panel. Plastic lighting plates need not be employed on the circuit breaker panels.

Reason for Change and Remarks: Secondary along with primary lighting of the consoles is recommended as a safety measure in the event of primary failure, and to give balanced cockpit lighting which is important to efficient night adaptation. Configuration location, and "in flight" need of lighting circuit breaker panels during night operation is such that primary lighting, per specification would be an unnecessary burden of weight, circuitry and space utilization in view of pilot practice of carrying some secondary light intensity during night operations as approved by Cockpit Mock-Up board 28 July 1954.

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248	3.16.8.2	Interior Lights

Requirement: Paragraph 3.2.2.3 - Utility Light - At least one type C-4A light assembly in accordance with Specification MIL-L-6484, shall be supplied for each of the operating personnel in all aircraft at his particular station for purpose of illuminating maps, charts and work areas.

Deviation: Type C-4A utility lights need not be installed.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-L-6503 (Cont)

248 (Cont) 3.16.8.2 Interior Lights (Cont)

Reason for Change and Remarks: Instrument Flood Lights provide suitable lighting for above requirement as approved by Cockpit Mock-up Board 28 July 1954.

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249 3.16.8.2 Interior Lights

Requirement: Paragraph 3.2.2.5 - Cabin Lighting - Cabin dome lights in accordance with Drawing AN3037 shall be used to provide general illumination of the radio, radar, navigator, bombardier, passenger, cargo, and engine nacelle compartments of aircraft.

Deviation: It shall be permissible to install Grimes light assembly (Drawing No. B-6245-24) in lieu of AN3037 light assembly.

Reason for Change and Remarks: AN3037 light assemblies are too large and heavy to be practicable for this type of airplane. The use of Grimes light assembly was approved by the Mock-up Board.

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250 3.16 11.3 Warning Lights

Requirement: Paragraph 3.2.2.8.1 - "Warning lights shall be red non-dimming, small jewel in accordance with Drawing AN3157, and shall be provided in connection with systems over which operating personnel have no control and gives a warning of trouble not

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (Cont)
250 (Cont)	3.16.11.3	Warning Lights

caused by personnel action and indicates immediate action required to prevent immediate loss of aircraft."

Deviation: (a) All warning lights are automatically dimmed when the flight instruments primary lights are turned on, except that they shall not be dimmed when the thunderstorm lights are on.

(b) Warning lights shall be of the two-bulb type similar to "Korry P/N 204 . . . . ."

Reason for Change and Remarks: (a) To alleviate the possibility of the pilot being blinded when a warning light comes on.

(b) The configuration of the cockpit and the mission of the airplane necessitates the integration of the entire cockpit for maximum utility and the warning system particularly will be of non-standard configuration. (Requested and approved by Mock-up Inspection Board on 7 and 8 April 1953, RFA #8, and cock-pit mock-up inspection on 29 July 1954.)

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251	3.16.11 3	Warning Lights

Requirement: Paragraph 3.2 2.8.2 - Caution Light - "Caution lights shall be amber, dimming, small jewel, in accordance with Drawing AN3157 . . . ."

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (Cont)
251 (Cont)	3.16.11.3	Warning Lights (Cont)

Deviation: Caution light shall be of the two-lamp type similar to "Korry P/N 204 . . . "

Reason for Change and Remarks: Master warning light was declared to be a "Caution Light" by Mock-up Board of 7 and 8 April 1953 and 28 and 29 July 1954, which brings it under this specification requirement. However, in size and arrangement, it must be treated similarly to the regular warning lights.

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252	3.16.8.2	Interior Lights
	3.19.7	Spare Bulbs

Requirement: Paragraph 3.2.3 - Spare Lamps - "All aircraft shall be furnished with one spare lamp for each 3 lamp assemblies (or fraction thereof) of each different type of lamps used for interior lighting.

Deviation: To provide stowage for 5 spare midget flanged base lamps only in addition to the normal requirements for spare candelabrum and miniature based lamps.

Reason for Change and Remarks: Compliance with the above requirement would result in provisioning for stowage of 50 spare midget flanged based lamps. The Contractor believes this would be an unwarranted waste of space and weight considered against the realities of spare lamp replacement accomplished by the pilot during any mission. Also, the loss of one lamp on any one instrument does not render the instrument nonvisible. Approved by Cockpit Mock-up Board 28 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-A-6543 Antenna System, L Band, Omni-Directional General Specification for
253	3.17.3.8.1	Radiation Pattern

Requirement: Paragraph 3.4.6 - Field Strength Pattern - The field strength pattern of the installed antenna system shall be essentially omni-directional in the horizontal plane. The minimum acceptable voltage field strength pattern shall be as follows, using the spherical coordinate system as illustrated in Figure 1.

Paragraph 3.4.6.1 - At any azimuth angle $\emptyset$ in the planes defined by the angle $\theta = \pm 5^\circ$, the field strength shall be equal to or greater than that of an isotropic radiator in free space with equal input power.

Paragraph 3.4.6.2 - At any azimuth angle / in the planes defined by $\theta = 80 \pm 5^\circ$, the radiation loss shall not exceed 1 decibel with respect to an isotropic radiator in free space with equal input power.

Paragraph 3.4.6.3 - At any azimuth angle $\emptyset$ in all planes from $\theta = 50^\circ$ to $\theta \pm 75^\circ$ and from $\theta = 105^\circ$ to $\theta = 130^\circ$, the radiation loss shall not exceed 4 decibels with respect to that of a free space isotropic radiator of equal input power except as modified in 3.4.6.4.

Paragraph 3.4.6.4 - In either the upper or lower hemisphere, but not both, from $\theta = 50^\circ$ to $\theta = 75^\circ$ or from $\theta = 105^\circ$ to $\theta = 130^\circ$, a minimum or minimums of field strength may exist having a total azimuth angle $\emptyset$, as measured between the -4 decibels gain points, of not more than 90° in any plane. However, the readiation loss at such a minimum or minimums shall not exceed 10 decibels with respect to an isotropic radiator in free space with equal input power.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-A-6543 (Cont)
253 (Cont)	3.17.3.8 1	Radiation Pattern

Deviation: The field strength pattern of the installed antenna system shall be the multilobed pattern which results when two antennas, which are separated by several wavelengths, are fed in parallel.

At any azimuth angle ϕ in the planes defined by the angle $\theta = 90 \pm 40°$, the envelope of this multilobed pattern shall represent field strength equal to or greater than that of an isotropic radiator in free space with equal input power, except as follows:

A deep null in the previously specified envelope shall exist in the solid angle defined by $\phi = 180 \pm 10°$ and angles of θ greater than 70° and less than 90°.

The greater lobes of this multilobed pattern shall occupy greater than 60% of the total solid angle of the specified envelope of radiation coverage. The lobe structure of this radiation pattern shall be sufficiently fine to provide an average lobe width of approximately 4.5° and an average null width of approximately 2.25°, at the isotropic level of this antenna system, in horizontal planes. In vertical planes, the average lobe width shall be approximately 7°, and the average null width shall be approximately 3.5°, at isotropic level.

Reason for Change and Remarks: The external configuration of the Delta wing airplane does not permit the use of a single antenna to provide the required coverage for this function. It is therefore necessary to use two or more antennas in a multiple antenna system.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-A-6543 (Cont)
253 (Cont)	3.17.3.8.1	Radiation Pattern

At the present state of the art, satisfactory methods of multiplexing two or more antennas, at the same frequency, are limited.

Two paralleled antennas, whose patterns taken separately cover all the specified directions of radiation, can provide a radiating IFF system with a high probability of response to interrogating signals which arrive at directions within the specified coverage zones.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6730, dated 9 June 1950 Lighting Equipment; Exterior, Installation of Aircraft (General Specification)
254	3.16.8.3	Exterior Lights

Requirement: Paragraph C-2 - "When applicable, aircraft exterior lighting systems shall contain the light assemblies shown in Table III."

Paragraph D-3b - Both top and bottom fuselage lights shall be equipped with clear white glass covers as specified in Table III."

Deviation: Special lights may be installed as required and as approved by the USAF.

Reason for Change and Remarks: Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights.

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255	3.16.8.3	Exterior Lights

Requirement: (1) Paragraph D-1a - Wing position light assemblies shall be installed on the tips of the outer wing panel as illustrated in figures #1 and #2.

(2) Paragraph D-1c - Wing position lights shall be visible from all positions within a 90 degree angle above and below the horizontal and within a 110 degree horizontal angle as illustrated on figures #1 and #2.

(3) Paragraph D-3a - Fuselage light assemblies shall be installed midway between the nose and the tail of the aircraft but aft of the pilot's cockpit. The top light shall be directly

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L 6730 (Cont)
255 (Cont)	3.16.8.3	Exterior Lights (Cont)

above the bottom light and the line through these two lights shall be perpendicular to the thrust line of flight.

Deviation: Wing position lights to be installed in accordance with contractor drawings subject to approval by WADC.

Reason for Change and Remarks: The Delta wing planform and the missile bay configuration does not lend itself to wing and fuselage light installations of figures #1 and #2. Approved by AMC letter dated 27 July 1954.

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256	3.16 8 3	Exterior Lights

Requirement: Paragraph D-2a (3) - Tail position lights shall not be installed where they will be subject to heat in excess of that specified in Specification AN-L-12.

Deviation: Tail position lights may be subject to a temperature of 250 degrees F, subject to WADC approval

Reason for Change and Remarks: Locating tail position lights in an area where they would not be subject to a temperature in excess of the 160 degrees specified by AN-L-12 would result in a severe weight penalty, due to the dense structure involved. Refer to CVAC Drawing No. 8-09032 (Proposal-Tail Position Lights) submitted to USAF for approval with CVAC Ltr No 6 3790 dated 16 August 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6730 (Cont)
257	3.16.8.3	Exterior Lights

Requirement: Paragraph D-2c Visibility - Tail position light assemblies shall be visible from all positions within 90 degrees above and below and right and left of the airplane fuselage thrust line when viewed from the rear.

Deviation: Visibility of tail position lights shall be as shown on CVAC drawing No. 8-09032 (Proposal-Tail Position Lights) submitted to USAF for approval with CVAC ltr No. 6-3790 dated 16 August 1954 and as finally approved by WADC.

Reason for Change and Remarks: Location possible for tail position lights results in 88-1/2 degrees aft visibility in lieu of 90 degree requirement.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-C-6822(1), dated 6 October 1950 - Clamp; Mounting, 2-Inch Size Instrument - Installation of
258	3.14.3	Instrument Installation

Requirement: Figure 1 - Specifies that clamps are to be mounted 45° from vertical.

Deviation: Clamps shall be installed to obtain maximum density of instruments within the panel.

Reason for Change and Remarks: Space in the panel is very limited and high density instrument spacing is imperative to maintain good vision over the panel.

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259	3.14.3	Installation

Requirement: Paragraph 4.3 - "It shall be determined that the flexible tube or wire available in front of the panel when the instrument is withdrawn, is a minimum of 4 inches.

Deviation: Flexible tube, wire, etc, shall be of sufficient length to permit disconnect from the instruments prior to withdrawal from the hinged panel.

Reason for Change and Remarks: Minimum of 4 inches is not realistic on this type installation as the panel is hinged at the bottom thus requiring varied lengths of tubes, wire, etc for withdrawal and disconnect depending on the position of the instrument.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No MIL-L-6880A dated 30 January 1952 - Lubrication of Aircraft, General Specification for
260	3.2.10	Lubrication

Requirement: Paragraph 3.4.2.3 - "Fittings where required for pressure lubrication shall be in accordance with Specification MIL-F-3541 and Standards MS15000, MS15001, MS15003 and MS15006."

Deviation: It shall be permissible to use NAS 497 and NAS 516 flush type fittings.

Reason for Change and Remarks: In certain applications clearance problems dictates the use of NAS flush type fittings. In other applications it is more adviseable to use a press fitting rather than the screw type fitting The NAS 497 fitting will be used until current stock is depleted which will then be replaced by the NAS 516 fitting.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E 7080, dated 27 December 1950 - Electrical Equipment; Installation of Aircraft, General Specification
261	3.16.4	Equipment - Installation

Requirement: Paragraph 3.1.5 (j) - "Ventilation: Adequate ventilation shall be provided. An operating temperature range of -55°C (-67°F) to +70°C (+158°F) has been established as the goal to which the design and manufacture of electrical equipment must be directed. It is required that electrical equipment be installed in such manner that these temperature ranges will not be exceeded under normal operating conditions of the aircraft unless otherwise specified."

Deviation: Temperatures in excess of the limits specified shall be permissible under high speed flight conditions, provided that it is demonstrated that the temperature is of such short duration and of such a value that the equipment shall not be damaged.

Reason for Change and Remarks: The short duration of excess temperature makes damage to equipment extremely unlikely and the weight and compromises of design required to keep the temperature within the specified limits are not warranted

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262 3.16.5 Wiring

Requirement: Paragraph 3.1.9 "Wiring shall be installed in accordance with Spec. AN-W-14."

Deviation: Wiring shall be installed in accordance with Spec. MIL-W-5088.

Reason for Change and Remarks: To specify applicable specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-E-7080 (Cont)**

263 3.16.4 Equipment - Installation

Requirement: (1) Paragraph 3.3.1 - Types. - Circuit breakers shall conform to Specification MIL-C-7079. Circuit breakers above 50 ampere capacity and those required for A.C. Circuits shall be approved by the Procuring Service. . ."

(2) Paragraph 3.3.1 - Fuses . . . shall not be used unless authorized by the Procuring Service.

Deviation: (1) Circuit breakers shall conform to Specification No. MIL-C-5809 or shall be a substitute trip-free breaker approved by the USAF. These breakers shall also be used for protection of alternating current circuits.

(2) Fuses may be used for the protection of the fuel booster pump power circuits.

Reason for Change and Remarks: (1) Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF models.

(2) The airplane generating system will not accept the overload characteristic of circuit breakers of the size required to protect the boost pump wiring - Fuses provide closer overload protection.

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264 3.16.4 Equipment - Installation

Requirement: Paragraph 3.3.2.1 - "Push-pull circuit breaker shall conform to Drawing AN 3161 and shall be used for circuit protection and emergency control."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
264 (Cont)	3.16 4	Equipment - Installation (Cont)

Paragraph 3.3.2 2 - "Switch circuit breakers shall conform to Drawing AN 3160. . . . ."

Deviation: Push-pull breakers shall conform to Drawings MS25005 and MS25006, switch breakers shall conform to Drawings MS25003 and MS25004 or shall be a substitute trip-free breaker approved by USAF.

Reason for Change and Remarks: Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF Models.

* * * *

Deviation	Paragraph	
265	3.16.7	Controls

Requirement: Paragraph 3.4 1.2 "Switches shall be installed in accordance with AND10453 "

Deviation: Switches shall be installed in accordance with AND10453 wherever practicable

Reason for Change and Remarks: Due to the limited space in the cockpit it may be necessary to space switches closer than specified.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
266	3.16.7	Controls

Requirement: Paragraph 3.4.1.4 - "Space shall be provided on each switch panel, containing four or more switches for the subsequent installation of one spare switch conforming to Drawing AN3022 and one switch conforming to Drawing AN3023."

Deviation: Space may not be available to meet the above requirement.

Reason for Change and Remarks: Maximum amount of space for subsequent switch installation shall be provided. However, due to large amount of instrumentation and switches, and configuration of the cockpit, it is impractical to comply with the above requirement.

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Deviation	Paragraph	
267	3.16.11.4	Meters

Requirement: Paragraph 3.5.2 - "The installation and location of meters shall be such as to afford good visibility and to minimize effects of parallax."

Deviation: Meters shall be located such that the effects of parallax, when unavoidable, shall be toward the safe side on metered quantities, considered by the Procuring Services, to be least detrimental to operation and/or safety of the aircraft.

Reason for Change and Remarks: Due to the small instrument panel area, high instrument density and consistent with adequate forward visibility, it was necessary to mock-up and obtain approval for the extreme right hand location of the AC Voltmeter.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
268	3.16.13	Relays

Requirement: Paragraph 3.6.1 - "Relays shall conform to Specification MIL-R-6106 and the applicable AN drawings."

Deviation: As required, relays may be of a design not covered by AN drawings subject to the approval of the Procuring Agency.

Reason for Change and Remarks: Special problems on this airplane requires the use of nonstandard relays.

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Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
269	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.7.1 - Types - Cutouts shall conform to Specification MIL-C-5026.

Paragraph 3.7.2 - Installation - Cutouts shall be installed in accordance with Drawing AN3025.

Deviation: The requirement of the above paragraph shall not apply.

Reason for Change and Remarks: The reverse current cutout function is included as a part of the D.C. control panel.

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Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
270	3.16.4	Equipment - Installation

Requirement: Paragraph 3.8.1 - "Rheostats shall conform to Specification MIL-R-6749, and are available in various standard capacities as shown on Drawing AN3155."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
270 (Cont)	3.16.4	Equipment - Installation (Cont)

Deviation: (1) It shall be permissible to use rheostats in accordance with JAN-R-19 and JAN-R-22.

(2) It shall be permissible to use Ohmite taper wound power rheostats where necessary.

Reason for Change and Remarks: (1) These rheostats are approved and can be obtained in smaller dimensions than the AN3155 rheostats, thereby conserving space in the cockpit.

(2) Ohmite taper wound power rheostats are required in some installations to provide sufficient electrical capacity and to fit into available space where neither AN or JAN rheostats will completely fulfill the requirements.

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271	3.16.10.3	Fuel Nozzle Grounding Jack

Requirement: Paragraph 3.10 - Fuel nozzle grounding receptacles shall be installed in accordance with Drawing AND10439.

Deviation: It shall be permissible to install fuel nozzle grounding receptacle less than 12 inches from the pressure refuel adapter fitting.

Reason for Change and Remarks: The space limitations and the location of receptacle make it impossible to comply with above requirements. The location of the receptacles was approved by the Mock-up Board.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
272	3.16.10.1	External Power

Requirement: Paragraph 3.15.3 (c) ". . . . The external power receptacle shall not be installed in wheel wells or bomb bays."

Deviation: The external power receptacle will be located in the left hand wheel well at approximately buttock line 25.5, water line 27.75 and station 443.3 and will be provided with pull away disconnect through a hole intthe wheel well bulkhead. A second D.C. external power receptacle will be installed in the aft electronics compartment forward of station 443.3.

Reason for Change and Remarks: The configuration of this aircraft and the amount of electronic equipment installed preclude installation to the above requirement and the requirement of Paragraph 3.17.3 of Specification MIL E 7563. The second external power receptacle will permit operation of the main landing gear while the aircraft is on jacks.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-E-7563 (USAF) dated 1 July 1952 - Electrical Equipment, Aircraft, Installation of (General Specification)
273	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.6.1 - "On aircraft with one generator the generator circuit shall conform to Drawing No. 49B7560. The total resistance from the "GEN" terminal of the relay switch conforming to Drawing AN3025 to the "B" terminal of the voltage regulator thence from the "A" terminal of the regulator to the "A" terminal of the generator shall not exceed 0.25 Ohm."

Deviation: The direct current generator circuit shall be of special design conforming to Convair Drawings to be submitted for WADC approval.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to improved simplified design of the direct current circuit

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274 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.6.5 - Generator controls shall consist of one ammeter per generator, one control switch per generator, one "Generator-off" indicator light per generator, one voltage adjusting rheostat per regulator, if required, and one voltmeter.... These controls shall be grouped together on the pilots or engineers electrical panel.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
274 (Cont)	3.16.2.1	Direct Current Power Supply (Cont)

Deviation: (1) A voltmeter shall not be required.

(2) An ammeter shall not be required.

(3) The generator switches shall be as required by the simplified control system, and shall be subject to approval by WADC.

Reason for Change and Remarks: (1) The duration of operation and the complexity of the airplane makes provisions for reading voltage unnecessary and undesirable.

(2) As approved by Cockpit Mock-up Board 28 July 1954.

(3) The simplified control system will reduce the number of operations required during an emergency.

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Deviation	Paragraph	
275	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.7.2.1 - The generator circuit protector shall be located as close as is practicable to the generator bus to reduce exposures to electrical faults and in no case shall be located more than 3 feet from the generator bus.

Deviation: Not applicable. Circuit protectors in the generator circuit shall be installed to provide adequate protection of the system, and shall be subject to approval by WADC.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
275 (Cont)	3.16.2.1	Direct Current Power Supply (Cont)

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the improved simplified design of the direct current circuit, and due to the fact that the feeder bus from the generator tying to the distribution bus is so short.

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276 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.7.3 - Distribution network.

Deviation: Not applicable.

Reason for Change and Remarks: This requirement is applicable to multi-generator installations only.

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277 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.8.1 - Regulator sub-base. Direct current voltage regulators shall be mounted on a sub-base in accordance with Drawing No. BE-49C7513. The sub-base shall be installed in a horizontal position when the airplane is in a normal flight attitude.

Deviation: No regulator sub-base shall be installed.

Reason for Change and Remarks: Regulator is included as a part of the D.C. Control Panel.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
278	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.9.1 - Reverse current cutout shall be accessible for unhampered inspection and maintenance.

Deviation: The requirements of the above paragraph shall not apply.

Reason for Change and Remarks: The function of the reverse current cutout are included in the D. C. Control Panel.

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Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
279	3.16.9	Ignition and Starting Control System

Requirement: Paragraph 3.10.2 Installation - For jet engine starting, the system shall consist of a split bus which will be tied to the main aircraft bus during air starts. It will be isolated during the ground starting cycle. The circuitry shall be as specified by the Procuring Agency.

Deviation: The starting control system shall be designed to the requirements of the manufacturer of the specified engine. Controls and circuitry shall be subject to WADC approval.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the fact that electric starters are not used.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
280	3.16.7	Controls

Requirement: Paragraph 3.13.1 - Hermetically sealed limit switches and switch actuators, if available, shall be used on all landing gear control and all landing gear warning systems where limit switches are required.

Deviation: Limit switches in enclosed housing may be used on nose landing gear with the approval of the Procuring service.

Reason for Change and Remarks: Hermetically sealed switches of the type required, due to extreme space limitations on the nose landing gear, are not available.

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Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
281	3.16.11.1	Alarms

Requirement: Paragraph 3.15.1 - The landing gear indicating and warning system for all aircraft with retractable landing gear units shall consist of one AN5839 indicator in accordance with Specification MIL-I-6839 . . . ., and an audible signal.

Paragraph 3.15.4 - Landing Gear Warning Signal. Unless otherwise specified by the Procuring Agency, the audible signal shall consist of a Type J 2 horn in accordance with Specification No. 32462, etc.

Paragraph 3.15.5 - The landing gear warning signal shall be electrically interconnected with the landing gear indicating system, etc.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
281 (Cont)	3.16.11.1	Alarms (Cont)

Paragraph 3.15.6 - The landing gear indicating and warning system shall be installed in accordance with Drawing No. 49B7565 and shall not be interconnected with any other circuit of the aircraft.

Deviation: A landing gear warning horn is not required.

Reason for Change and Remarks: It was the request of the Procuring Agency that the landing gear warning horn be omitted. Reference Item 106 of mock-up inspection comments of 13-21 Nov 1952.

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282 3.8.2.5 Retracting, Extending and Locking System

Landing Gear Indicating and Warning Systems

Requirement: Paragraph 3.15.3. The light shall be on to illuminate the red, wheel shaped knob when any gear is not exactly consistent with the position selected by the landing gear control.

Deviation: Landing gear control knob shall be clear translucent plastic with red light bulb, which shall cause plastic to glow red when any gear is not exactly consistent with the position selected by the landing gear control.

Reason for Change and Remarks: (a) Red plastic control knobs glow in direct sunlight, resulting in impression that light is on and gear out of position.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
282 (Cont)	3.8.2.5	Retracting, Extending and Locking System Landing Gear Indicating and Warning Systems (Cont)

(b) USAF design drawing AD 26 requires that landing gear control knob be of clear translucent plastic.

(c) Approved by Mock-Up Board of 28-29 July 1954. Ref. RFA #36.

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283 3.16.7.1 Power Controls

Requirement: Paragraph 3.17.3 - "For interceptor type aircraft the external power receptacles shall be so installed to permit automatic release of the external power cables upon movement of the aircraft."

Deviation: Installation of external power receptacle shall be made in such a manner as to disconnect the cables by movement of the airplane in pulling away from the mooring location.

Reason for Change and Remarks: To comply with Air Force request made at the mock-up inspection.

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284 3.16.4 Equipment - Installation

Requirement: Paragraph 3.10.1 - Rheostats shall conform to Specification MIL-R-6749 and are available in various standard capacities as shown on Drawing AN3155. Special rheostats

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-E-7563 (Cont)

284 (Cont) 3.16.4 Equipment - Installation (Cont)

not covered by the above specification shall be selected from Specification JAN-R-22.

Paragraph 3.19.2 - Special Purpose Rheostats - Special purpose rheostats, when required, shall be installed as directed by the Procuring Agency.

Deviation: It shall be permissible to use rheostats in accordance with JAN-R-19.

Reason for Change and Remarks: These rheostats are approved and can be obtained in smaller dimensions than the AN3155 rheostats, thereby conserving space in the cockpit.

* * * *

285 3.16.11.4 Meters

Requirement: (1) Paragraph 3.21.1 - An ammeter in accordance with Specification No. MIL-A-5125 shall be installed.

(2) Paragraph 3.21.2 - A direct current voltmeter in accordance with Specification No. MIL-A-6752 shall be installed.

Deviation: (1) A direct current ammeter shall not be required.

(2) A direct current voltmeter shall not be required.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
285 (Cont)	3.16.11.4	Meters (Cont)

Reason for Change and Remarks: As approved by the mock-up board and for weight savings.

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286	3.16.11.3 3.16.11.4	Warning Lights Meters

Requirement: Paragraph 3.21.3 - Meters shall be located on the pilot's or engineer's instrument panel and shall be grouped together and in close proximity to the generator control switch and the generator failure indicating lights.

Deviation: (a) The generator failure indicating light shall be located on the master warning panel.

(b) The location of the meter and generator failure lights shall be subject to AF approval.

Reason for Change and Remarks: Congestion in the cockpit and the requirements for giving preference to the Fire Control System controls makes compliance impossible. As approved at cockpit mock-up inspection 29 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-7788, dated 23 October 1951 - Plate, Plastic Cockpit and Interior Controls Lighting
287	3.16.8.2	Lighting - Interior

Requirement: 3.7 - Mounting - "Light assemblies shall not be employed to secure plastic plates to the mounting plate. Number 4-40 washer-head screws (Blackhead) with captive nuts attached to the mounting plate, and a thin-walled bushing shall be employed to secure the plastic plate to the mounting plate. The bushing shall be designed to prevent excessive pressure on the plastic plate. Other devices may be provided when approved by the Procuring Agency."

Deviation: All plastic panels requiring more than one light assembly may be secured to the mounting plate by means of the light assembly cap and rubber light seal grommet only. All plastic panels requiring only one light assembly shall have at least one attachment in addition to the light assembly cap and grommet. This attachment may be a #6-32 AN526 truss head screw with captive nut attached to the back of the mounting plate.

Reason for Change and Remarks: To allow the use of light assemblies to secure the plastic lighting plate to the mounting plate for plastic lighting panels. This change requested by CVAC Letter 6-5918 dated 12-30-52 and approved by AMC Letter MCPPAF6 (WCOWF) HCH/bh dated 2-20-53.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-G-7818 dtd 26 November 1951 - Gage, Fuel Quantity Capacitor Type, Compensated, General Specifications for
288	3.12.9.9	Quantity Gages and Flowmeters

Requirement: Paragraph 3.6 - "Hook-Up wire and external unshielded connector cable shall be in accordance with Specification JAN-C-76."

Deviation: Wire conforming to Specification MIL-W-5274A may be used for inter-component connection.

Reason for Change and Remarks: To provide uniform type wire usage in the aircraft. (AMC Ltr MCPPAF-6 (WCOWF-6) dated 3 July 1953).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-7890 Installation of Anti "G" suit pressure regulating valve in jet-propelled aircraft.
289	3.10.1.2	- - - - -

Requirement: Paragraph 3.3.11.1 - Pressure - The system from the air compressor of the jet engine to the pressure regulating valve shall operate at a maximum gas pressure of 125 psi.

Deviation: The system pressure will exceed 125 psi. System pressure will be 200 psi maximum.

Reason for Change and Remarks: Air from the turbo-jet engine will be led to the pressure regulating valve. The pressure of this air is compatible with pressures shown in Military Specification for the regulating valve MIL-V-9370 under paragraph 1.1.

* * * *

290	3.10.1.2	Anti "G" Suit Valve

Requirement: Paragraph 3.5.4.1. The pressure-regulating valve shall conform to AN6538. The valve shall be located in the cockpit on the left side of the pilot. The valve shall be mounted within normal sight and reach of the pilot to facilitate selection of high or low pressure settings during flight.

Deviation: (a) The pressure regulating valve shall be in conformance with Specification MIL-V-9370.

(b) The valve shall be located on the left side of the pilot in the aft, outboard corner of the left hand console.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-7890 (Cont)
200 (Cont)	3.19.1.2	Anti "G" Suit Valve (Cont)

Reason for Change and Remarks: (a) Per ECP 13 (CCN 023 requested by USAF.

(b) Space limitations prohibits locating valve any further forward. Location approved by Mock-Up Board of 28-29 July 1954. Ref. RFA 036.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-G-7940, Gages, Fuel Quantity, Capacitor Type, Installation and Calibration
291	3.12.9.9	Quantity Gages and Flowmeters

Requirement: Paragraph 3.4.6 - . . . . . the solderless type terminals shall be in accordance with Drawing AN659.

Deviation: Preinsulated-type terminals approved by the procuring service shall be used and shall be replaceable by AN659 terminals.

Reason for Change and Remarks: To make tank wiring consistent with balance of airplane wiring.

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Deviation	Paragraph	Military Specification No. MIL-G-7940, Gages, Fuel Quantity, Capacitor Type, Installation and Calibration
292	3.12.9.9	Quantity Gages and Flowmeters

Requirement: Paragraph 3.6.2.1 - The unit containing the calibration adjustments, wherever practicable, shall be so located that the indicator is visible while adjustments are being made.

Deviation: The indicator need not be visible while adjustments are being made.

Reason for Change and Remarks: The congested condition of the cockpit precludes the possibility of location for the calibration unit therein.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memorandum Report No. MCREXP-524-3006, dated 1 December 1950 - "Design of Pressure Refueling Systems for Aircraft"
203	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.4 - "Design Criteria - Refueling." . . . . "Under these conditions, line sizes in the refueling systems are to be selected such that all tanks theoretically reach the full position simultaneously." Complete refueling in 3 minutes but not exceeding 600 GPM."

Deviation: No special provisions shall be made to insure that both L. H. and R. H. tanks reach full simultaneously. Tank lines shall be designed for a maximum refueling rate of 200 GPM. Complete refueling in 6 minutes but not to exceed 200 GPM.

Reason for Change and Remarks: To save weight and to prevent high pressure build-up in the tank during filling.

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204	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3 5 - "Design Criteria - Defueling - The system shall provide for ground defueling of the airplane at a minimum rate of 200 GPM when suction pressure of 11 psig is applied to the airplane adaptor at the inlet of the type D-1 nozzle. When suction is not available, the airplane booster pumps shall be capable of pumping all fuel out of the airplane through the adaptor and nozzle but not necessarily at the above rate. Vent lines shall be adequate to allow a defueling of the maximum rate from each tank individually when the above suction is applied without experiencing any negative pressures within the tank."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memo Report No. MCREXP-524-3006 (Cont)
294 (Cont)	3.12.9.13	Refueling Provisions (Cont)

Deviation: Defueling shall be accomplished by using booster pumps with tanks pressurized by an external source, or by tank pressurization and suction. In the later case the defueling rate shall be not less than 45-50 GPM/side.

Reason for Change and Remarks: Considerable weight saving is realized by not complying with above in that extremely large size line would be required. Also, it is necessary that tanks be pressurized and sequenced for c.g. control.

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295	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.8 - "Tank Selection - It shall be possible to select any tanks for filling and conversely to avoid filling any tanks."

Deviation: Provisions for tanks to be filled selectively shall not be required.

Reason for Change and Remarks: Fuel from tanks is used in a specific sequence for c.g. control, conversely tanks are filled in the reverse sequence.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENT

Deviation	Paragraph	Memo Report No. MCREXP-524-3006 (Cont)
296	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.9 - "Fuel Shut-Off Provisions - For airplanes with provisions for ground refueling only, at least one of the shut-off devices shall be of the "fail closed" design.

Deviation: Provisions for "fail closed" control valve shall not be required.

Reason for Change and Remarks: The vent and fuel tank pressure relief systems are adequate to prevent excessive pressures in the wing if the shut-off or pilot valves fail.

* * * *

297	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.14 - "Tank-Filler Caps - The requirements for a pressure refueling system shall in no way delete existing requirements for normal tank filler caps."

Deviation: Gravity filling requirements shall not be incorporated.

Reason for Change and Remarks: Main fuel tanks may be filled by pressure refueling, (single point) only. This is as established through correspondence between CVAC and WADC. (Ref Convair ltr 6-3490 of 2 July 1952).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENT

Deviation	Paragraph	AND 10064 Fittings - Installation of Flared Tube, Straight Threaded Connections, dated 10 May 1949
298	3.2.11	Standard Parts

Requirement: Installation as described by (AND 10064) is required by MIL-H-5440 and other system specifications. The installation requires one (1) washer placed between the body of the fitting and the bulkhead or bracket in which it is installed.

Deviation: It shall be permissible to use additional washers between the bulkhead or bracket and the AN924 nut where specified on engineering drawings.

Reason for Change and Remarks: To prevent chafing of bulkhead or bracket surfaces when tightening the nut.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph ANA Bulletin 386 - Recommended Guide for Location and Actuation of Pilot Controls, dtd 15 Nov. 1949.

299 3.10.2.3 Check-Off List

Requirement: Paragraph 2.1.1 - (a) Location - The landing check-off list will be located on the left and the take-off check-list will be located on the right of the instrument panel or adjacent thereto.

(b) Comments - A landing check-off list and a take-off check off list are primary requirements, etc. etc.

Deviation: (a) and (b) Landing and take-off check-off lists shall be combined in one unit and said unit shall be located on the right hand side of the cockpit.

Reason for Change and Remarks: Approval by Mock-Up Board of 28 - 29 July 1954. Ref. RFA #36.

* * * *

300 3.10.3 Trim Control

Requirement: Paragraph 2.1.6 - (a) Location - For electrically operated trim tabs - The trim tab control location shall be immediately aft of power control or on top of the aft portion of the control stick grip.

Deviation: Rudder trim switch shall be located on the utility switch panel which is located at centerline of airplane below main instrument panel.

Reason for Change and Remarks; Approval by Mock-Up Board of 28 - 29 July 1954. Ref. RFA #36.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph ANA Bulletin 386 (Cont)

301 3.7.1.3.4 Emergency Canopy Release Control

Requirement: Paragraph 2.1.19 - (a) Location - The emergency canopy release control shall be operated by the normal canopy control.

(b) Actuation - The emergency or jettison position of the canopy control shall be aft of the open position of the canopy control, but the movement from normal canopy control open position to the emergency or jettison position shall be through a gate stop.

Deviation: (a) and (b) - The emergency canopy release control shall be separate from the normal canopy release control.

Reason for Change and Remarks: Approval by Mock-Up Board of 28 - 29 July 1954. Ref. RFA #66.

* * * *

302 3.19.2.2 Map Stowage

Requirement: Paragraph 2.9.7 - (a) Location - The map stowage location shall be on the right side.

Deviation: (a) Map stowage shall be in aft inboard corner of L. H. console.

Reason for Change and Remarks: No space available on R. H. side due to large amount of electronic equipment. L. H. side location approved by Mock-Up Board of 28 - 29 July 1954. Ref. RFA #66.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	ANA Bulletin 386 (Cont)
303	3.20.1	Air Conditioning

Requirement: Paragraph 2.10.2 - (a) Location - The pressure cabin control lever and the temperature control switch shall be located on the right console forward.

(b) Actuation - The control motion for the pressure cabin control lever shall be forward for pressure cabin and aft for dump and ram air. The control for the temperature control switch shall be clockwise for increase.

Deviation: (a) The pressure cabin control shall be a switch in lieu of a lever and shall be located on left hand auxiliary panel forward of and above the left console. The temperature control switch shall be located on the utility switch panel which is located at centerline of airplane below main instrument panel.

(b) The control motion for the pressure cabin control switch shall be up for pressure cabin and down for dump and ram air.

Reason for Change and Remarks: (a) No space available on right console. Location approved by Mock-Up Board of 28 - 30 July 1954. Ref. RFA 636.

(b) Due to cabin pressure switch being mounted in a plane approaching the vertical, "UP" and "DOWN" is more descriptive of the switch than "FORWARD" and "AFT" would be.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	ANA Bulletin 386 (Cont)
304	3.7.1.3.4	Canopy Control

Requirement: Location - The canopy control shall be located on the left side forward and as high as possible

Deviation: Canopy control handle to be in right lower corner of instrument panel, as shown in mock-up.

Reason for Change and Remarks: Approval by Mock-Up Board of 28 - 29 July 1954. Ref. RFA #66

* * * *

APPENDIX III-A

The following details and assemblies shall be interchaneable within the definition of Specification AN-I-21

F-102A INTERCHANGEABILITY LIST

1. Elevon assembly
2. Wing tip assembly
3. Wing leading edge assembly except stub assembly
4. Rudder assembly
5. Vertical stabilizer tip assembly
6. Vertical stabilizer leading edge except stub assembly
7. Fuselage tail cone assembly
8. Fuselage nose radome assembly
9. Speed brake assembly
10. Windshield and canopy transparent panel assemblies
11. Main landing gear assembly and removable components of main landing gear assembly
12. Nose landing gear assembly and removable components of nose landing gear assembly
13. Power plant installation (quick-change feature - power plant assembly)
14. Engine air intake ducts which are not integral with fuselage structure
15. Rocket and missile displacing gear mechanism (not missile bay doors)

APPENDIX III-A

The following details and assemblies shall be interchangeable within the definition of Specification AN-I-21.

F-102A INTERCHANGEABILITY LIST (Cont)

16. Ejection seat assembly
17. Control stick assembly (stick and grip assembly - not including yoke arrangement)
18. Rudder and brake pedal assembly
19. Control system parts such as bellcranks, control arms, walking beams, push-pull rods, eccentric sheaves, shafts and similar related parts. (Except those that are required to be attached by taper pins or rivets, or where permissible tolerance dictates matched drilling or reaming).
20. Temperature regulators
21. Pressure regulators
22. Intercoolers
23. Hydraulic and high pressure pneumatic system units (exclusive of tubing, tubing assemblies and tubing mounting parts)
24. Structural access doors (except those made of sheet metal capable of being trimmed to fit at installation with hand tools)
25. Provisions for mounting all GFAE
26. Instrument panel assembly
27. Cockpit console panels (individual panel assemblies on top of side consoles only)
28. Rocket packages

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APPENDIX III-B

The following details and assemblies shall be replaceable within the definition of Specification AN-I-31

F-102A REPLACEABILITY LIST

	ITEM	REASON FOR NOT BEING INTERCHANGEABLE
1.	Wing assembly	Match drilling required for wing-to-fuselage attach angle.
2.	Armament Bay Doors	Skin and hinge trim at installation.
3.	Main alighting gear closure doors	Skin trim at installation.
4.	Nose alighting gear closure doors	Skin trim at installation.
5.	Fairings	
6.	Control horns, masts, brackets, bellcranks, control arms, walking beams, push-pull rods, eccentric sheaves, shafts and similar related parts that are required to be attached by taper pins or rivets, or where permissible tolerances dictate matched drilling or reaming.	
7.	Inspection doors unstressed.	Skin trim and drill at installation.
8.	Structural access doors made of sheet metal and capable of being trimmed at installation with hand tools	Interchangeable with respect to attach points. Skin trim at installation.
9.	Stub assembly-vertical stabilizer leading edge	Variation in attach holes. Match drilling required with respect to drag angle.
10.	Stub assembly - wing leading edge	Variation in attach holes. Match drilling required with respect to drag angle.
11.	Fuselage movable canopy assembly	Interchangeable with respect to contour, latches and hinge points. Skin trim at installation.

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PREPARED BY
CHECKED BY
REVISED BY

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO

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MODEL
DATE

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MODEL SPECIFICATION

FOR

CONVAIR MODEL 8

UNITED STATES AIR FORCE MODEL TF-102A

TRAINER FIGHTER AIRPLANE

CONTRACT AF33(600)-23903

* * * *

REPORT NO. ZD-8-004-A

DATED 15 NOVEMBER 1954

* * * *

SUPERSEDES ZD-8-004

REVISED 15 FEBRUARY 1954

* * * * * * *

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By ______________ Specification Section

Approved W. M. Fox Project Engineer

Checked ______________ Specification Section

Approved ______________ for Chief Engineer

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TABLE OF CONTENTS

1. SCOPE AND CLASSIFICATION 1

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS 2

3. REQUIREMENTS 3

3.1 CHARACTERISTICS 3
3.1.1 THREE VIEW DRAWING 3
3.1.2 PERFORMANCE 3
3.1.3 WEIGHTS 7
3.1.4 CENTER OF GRAVITY LOCATIONS 12
3.1.5 AREAS 14
3.1.6 DIMENSIONS AND GENERAL DATA 14
3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS 16

3.2 GENERAL 17
3.2.1 GENERAL INTERIOR ARRANGEMENT 17
3.2.2 MATERIALS 17
3.2.3 WORKMANSHIP 18
3.2.4 PRODUCTION, MAINTENANCE AND REPAIR 18
3.2.5 INTERCHANGEABILITY AND REPLACEABILITY 18
3.2.6 FINISH 18
3.2.7 IDENTIFICATION AND MARKING 18
3.2.8 EXTREME TEMPERATURE OPERATION 18
3.2.9 CLIMATIC REQUIREMENTS 19
3.2.10 LUBRICATION 19
3.2.11 STANDARD PARTS 19
3.2.12 CREW 19
3.2.13 EQUIPMENT INSTALLATION 20
3.2.13.1 ARMAMENT 20
3.2.13.2 COMMUNICATION AND NAVIGATION EQUIPMENT 20
3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION 20

3.3 AERODYNAMICS 21
3.3.1 GENERAL 21
3.3.2 STABILITY AND CONTROL 21

CONFIDENTIAL

UNCLASSIFIED

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7

SUMMAR

DESIGN FLI

Configuration	Maneuver	Sym. Load Factor "g"	D
Clear airplane	Symmetrical pullout	-3.0 to 6.0	C_L =
	Gusts - Lateral and symmetrical		0 to
	Rolling pullout	0 to +3.9	C_L =
	Rudder induced maneuvers	1.0	270
External fuel tanks on.			
Tanks full (max. take-off weight)	Symmetrical pullout	-1.0 to 3.0	C_L = o
	Rolling pullout	0 to + 2.33	C_L = o
	Rudder induced maneuver	1.0	C_L = o
Tanks empty (full internal fuel).	Symmetrical pullout	-2.5 to + 5.10	C_L = o
	Rolling pullout	0 to 3.9	C_L = o
	Rudder reduced maneuver	1.0	C_L = or
Tanks full or empty	Lateral and symmetrical gusts		0 to or V
Armament extended	Symmetrical pullout	-1 to + 3	C_L =
	Steady sideslip	1.0	C_L =
Landing gear extended	Symmetrical pullup	0 to 2.5	0 to
	Rudder induced maneuver	1.0	0 to

"Th[illegible]sion makes the minimum design altitude sea-level for all conditions, a

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UMMARY OF TF-102A

FLIGHT CONDITIONS

Design Speed Range	Restriction Imposed in Design	Remarks
C_L = 0.75 to V_L	-1.6g below 12,000 ft. and above V_C = 480 kts.	
0 to V_H	Below 5,000 ft. 0 to 600 knots	$50/\sigma^{\frac{1}{2}}$ ft./sec. sharp edge gust.
C_L = 0.75 to V_L	4.5° of aileron below 20,000' and above V_C = 450 knots.	Full available aileron (6.3°) in the unrestricted regions.
270 kts. to V_L		Rudder rapidly applied. Limited to automatic control authority or 180 pounds pedal force.
C_L = 0.75 to M = 0.95 or V_i = 450 kts.		
C_L = 0.75 to M = 0.95 or V_i = 450 kts.	3° aileron above V_C = 270 knots.	Full available aileron (6.3°) with gear down.
C_L = 0.75 to M = 0.95 or V_i = 450 kts.	Maximum rudder deflection restricted to 6.0° above V_C = 480 kts.	No abrupt rudder deflection.
C_L = 0.75 to M = 0.95 or V_i = 450 kts.		
C_L = 0.75 to M = 0.95 or V_i = 450 kts.		
C_L = 0.75 to M = 0.95 or V_i = 450 kts.		Rudder rapidly applied. Limited to 180 pounds pedal force.
0 to M = 0.95 or V_i = 450 kts.		$50/\sigma^{\frac{1}{2}}$ ft./sec. sharp edge gust.
C_L = 0.75 to V_L		
C_L = 0.75 to V_L		Arbitrary 1.0g lateral acceleration, n_y, will provide adequate strength. Actual maneuvers are not probable during short period for which armament is extended.
0 to 270 kts.		
0 to 270 kts.		Rapidly applied rudder. Limited to 300 pounds pedal force.

ons. and reflects the incorporation of the large tail.

CONFIDENTIAL

TABLE OF CONTENTS

3.3.2.1 STABILITY AND CONTROLLABILITY. 21
3.3.2.2 PERMISSIBLE AERODYNAMICS CENTER OF GRAVITY LIMITS 21
3.3.2.3 SPEED BRAKE OPENING 21
3.3.2.4 LONGITUDINAL DECELERATION 21

3.4 STRUCTURAL DESIGN CRITERIA 22
3.4.1 LIMIT FLIGHT LOAD FACTORS 22
3.4.2 LIMIT GROUND LOAD FACTORS. 22
3.4.3 LIMIT DIVING SPEED. 22

3.5 WING GROUP. 25
3.5.1 DESCRIPTION AND COMPONENTS 25
3.5.2 CONSTRUCTION 25
3.5.3 ELEVONS 25
3.5.4 LIFT AND DRAG INCREASING DEVICES 25

3.6 TAIL GROUP. 26
3.6.1 DESCRIPTION AND COMPONENTS 26
3.6.2 STABILIZER 26
3.6.3 ELEVATOR 26
3.6.4 FIN 26
3.6.4.1 DROGUE PARACHUTE 26
3.6.5 RUDDER. 26

3.7 BODY GROUP 27
3.7.1 FUSELAGE. 27
3.7.1.1 DESCRIPTION 27
3.7.1.2 CONSTRUCTION 27
3.7.1.3 CREW AND PERSONNEL STATIONS 27
3.7.1.4 CARGO COMPARTMENTS 28
3.7.1.5 EQUIPMENT COMPARTMENTS 28
3.7.1.6 SPEED BRAKES 28
3.7.1.7 ROCKET AND MISSILE BAYS 28
3.7.1.8 WHEEL WELLS. 28
3.7.1.9 ACCESSORY COMPARTMENT 28
3.7.2 HULL 28

~~CONFIDENTIAL~~

TABLE OF CONTENTS

3.8 ALIGHTING GEAR. 29
3.8.1 GENERAL DESCRIPTION 29
3.8.2 MAIN LANDING GEAR. 29
3.8.2.1 DESCRIPTION 29
3.8.2.2 WHEELS, BRAKES AND BRAKE CONTROL SYSTEMS. . . . 29
3.8.2.3 TIRES AND TUBES 29
3.8.2.4 SHOCK ABSORBERS. 29
3.8.2.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS . . . 29
3.8.2.6 DOORS AND FAIRINGS. 29
3.8.2.7 INSPECTION AND MAINTENANCE 30
3.8.3 AUXILIARY LANDING GEAR (Tail Wheel) 30
3.8.4 AUXILIARY LANDING GEAR (Nose Wheel). 30
3.8.4.1 DESCRIPTION 30
3.8.4.2 WHEEL 30
3.8.4.3 TIRE AND TUBE 30
3.8.4.4 SHOCK ABSORBER 30
3.8.4.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS . . . 30
3.8.4.6 DOORS AND FAIRINGS. 30
3.8.4.7 STEERING CONTROL 30
3.8.4.8 INSPECTION AND MAINTENANCE 31
3.8.5 IN-FLIGHT OPERATING CONDITIONS. 31

3.9 ALIGHTING GEAR (Water Type) 31

3.10 SURFACE CONTROL SYSTEM 32
3.10.1 PRIMARY FLIGHT CONTROL SYSTEM 32
3.10.1.1 FLIGHT STATION CONTROLS 32
3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS 32
3.10.2.1 LIFT AND DRAG INCREASING DEVICE SYSTEMS 32
3.10.2.2 SPEED BRAKES 32
3.10.3 TRIM CONTROL SYSTEMS 32
3.10.4 AUTOMATIC FLIGHT CONTROL DEVICES 33
3.10.4.1 PITCH AND YAW DAMPER SYSTEM 33
3.10.4.2 PILOT ASSIST SYSTEM 33
3.10.4.3 PITCH G-LIMITER 33
3.10.4.4 AUTOMATIC FLIGHT CONTROL SYSTEM 33
3.10.5 MODES OF FLIGHT CONTROL 33
3.10.5.1 DIRECT MANUAL. 33

CONFIDENTIAL

TABLE OF CONTENTS

3.10.5.2 MANUAL 34
3.10.5.3 PILOT ASSIST. 34
3.10.5.4 AUTOMATIC FIRE CONTROL 34

3.11 ENGINE SECTION 35
3.11.1 DESCRIPTION AND COMPONENTS 35
3.11.2 CONSTRUCTION 35
3.11.3 ENGINE MOUNTS 35
3.11.4 VIBRATION ISOLATORS 35
3.11.5 FIREWALLS 35
3.11.6 COWLING AND COWL FLAPS 35
3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE 35
3.11.8 FIRE ACCESS DOORS 35

3.12 PROPULSION 36
3.12.1 GENERAL DESCRIPTION AND COMPONENTS 36
3.12.2 MAIN PROPULSION UNIT 36
3.12.3 AUXILIARY PROPULSION UNIT 36
3.12.4 ENGINE-DRIVEN ACCESSORIES 36
3.12.5 AIR INDUCTION SYSTEM 36
3.12.6 EXHAUST SYSTEM 36
3.12.7 COOLING SYSTEM 36
3.12.8 LUBRICATING SYSTEM 37
3.12.8.1 DESCRIPTION AND COMPONENTS 37
3.12.9 FUEL SYSTEM 37
3.12.9.1 DESCRIPTION AND COMPONENTS 37
3.12.9.2 PUMPS. 37
3.12.9.3 TANKS (Fixed) 37
3.12.9.4 TANKS (Jettisonable) 38
3.12.9.5 VENT SYSTEM 38
3.12.9.6 PIPING AND FITTINGS 38
3.12.9.7 VALVES 38
3.12.9.8 STRAINERS AND FILTERS. 38
3.12.9.9 QUANTITY GAGES AND FLOWMETERS 38
3.12.9.10 DRAINAGE PROVISIONS 39
3.12.9.11 FUEL EVAPORATION AND TRANSFER CONTROL 39
3.12.9.12 REFUELING PROVISIONS 39
3.12.9.13 DEFUELING PROVISIONS 39

CONFIDENTIAL

CONFIDEN[redacted]

TABLE OF CONTENTS

3.12.10 WATER INJECTION SYSTEM 39
3.12.11 PROPULSION SYSTEM CONTROLS 39
3.12.12 STARTING SYSTEM 39
3.12.13 PROPELLER 39
3.12.14 ROCKET PROPULSION SYSTEM 39

3.13 AUXILIARY POWER PLANT 40

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT 41
3.14.1 INSTRUMENTS 41
3.14.1.1 STUDENT INSTRUMENTS 41
3.14.1.2 INSTRUCTORS INSTRUMENTS 41
3.14.2 NAVIGATION EQUIPMENT 42
3.14.3 INSTALLATION 42

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS 43
3.15.1 HYDRAULIC SYSTEM 43
3.15.1.1 DESCRIPTION AND COMPONENTS 43
3.15.1.2 SUMMARY OF ACTUATED ITEMS 44
3.15.2 PNEUMATIC SYSTEMS 44
3.15.2.1 LOW PRESSURE PNEUMATIC SYSTEM 44
3.15.2.2 HIGH PRESSURE PNEUMATIC SYSTEM 44

3.16 ELECTRICAL 46
3.16.1 DESCRIPTION 46
3.16.2 ELECTRICAL POWER SUPPLY 46
3.16.2.1 DIRECT CURRENT 46
3.16.2.2 ALTERNATING CURRENT 46
3.16.3 ELECTRICAL POWER CONVERSION 47
3.16.3.1 INSTRUMENT POWER 47
3.16.3.2 EMERGENCY POWER 47
3.16.4 EQUIPMENT INSTALLATION 47
3.16.5 WIRING 47
3.16.6 BONDING 47
3.16.7 CONTROLS 48
3.16.7.1 POWER CONTROL 48
3.16.8 LIGHTING 48
3.16.8.1 GENERAL 48
3.16.8.2 INTERIOR 48

[redacted]L

[redacted]

TABLE OF CONTENTS

3.16.8.3 EXTERIOR 49
3.16.9 IGNITION AND STARTING CONTROL SYSTEM 49
3.16.10 RECEPTACLES 49
3.16.10.1 EXTERNAL POWER 49
3.16.10.2 ELECTRICAL CONNECTORS 49
3.16.10.3 FUEL NOZZLE GROUNDING JACK 49
3.16.10.4 STATIC GROUND 50
3.16.11 INDICATORS 50
3.16.11.1 ALARMS 50
3.16.11.2 SIGNAL ASSEMBLIES 50
3.16.11.3 WARNING LIGHTS 50
3.16.11.4 METERS 51
3.16.12 ELECTRIC DRIVES 51
3.16.13 RELAYS 51
3.16.14 BOOSTER COIL 51
3.16.15 FILTERS 51
3.16.16 LOAD ANALYSIS 51

3.17 ELECTRONICS 52
3.17.1 EQUIPMENT 52
3.17.1.1 CONTROL PANEL 53
3.17.1.2 ANTENNAS 54
3.17.1.3 INTERFERENCE 54
3.17.1.4 WIRING 54
3.17.1.5 COOLING 55
3.17.2 COMMUNICATIONS EQUIPMENT 55
3.17.2.1 COMMAND SET AN/ARC - 34 55
3.17.2.2 LIAISON SET 55
3.17.2.3 INTERPHONE 55
3.17.2.4 MICROPHONE AND HEADSETS 55
3.17.2.5 FILTER EQUIPMENT 55
3.17.2.6 RECORDING EQUIPMENT 55
3.17.3 NAVIGATION EQUIPMENT 55
3.17.3.1 RADIO COMPASS 55
3.17.3.2 MARKER BEACON EQUIPMENT 56
3.17.3.3 INSTRUMENT APPROACH EQUIPMENT 56

[redacted]

CONFIDENTIAL

TABLE OF CONTENTS

3.17.3.4 ALTIMETER - RADIO 56
3.17.3.5 RADIO RANGE RECEIVER 56
3.17.3.6 HOMING ADAPTER AN/ARA - 25 56
3.17.3.7 VHF NAVIGATION RECEIVER AN/ARN - 14 57
3.17.3.8 DISTANCE MEASURING EQUIPMENT AN/ARN-21 . . 57
3.17.3.9 ARBITRARY COURSE COMPUTER 57
3.17.4 RADAR 57
3.17.4.1 SEARCH EQUIPMENT 57
3.17.4.2 LORAN EQUIPMENT 57
3.17.4.3 AUTOMATIC GROUND POSITION INDICATING EQUIPMENT 57
3.17.4.4 IDENTIFICATION EQUIPMENT 58
3.17.4.5 INTERROGATION EQUIPMENT 59
3.17.4.6 RADAR BEACON 59
3.17.4.7 FIRE CONTROL SYSTEM 59
3.17.5 ELECTRONIC COUNTERMEASURE 60
3.17.6 ELECTRONIC GUIDANCE SYSTEM 60
3.17.6.1 GUIDE LINKS AND SYSTEMS 60
3.17.6.2 ANTENNA - DATA LINK 60
3.17.7 STATIC DISCHARGERS 60
3.17.8 EMERGENCY RESCUE TRANSMITTER 60
3.17.9 RADOME 60
3.17.10 GROUND TEST EQUIPMENT OUTLETS 60

3.18 ARMAMENT 61
3.18.1 DESCRIPTION 61
3.18.2 FIXED GUNS 61
3.18.3 ROCKETS AND MISSILES 61
3.18.3.1 DESCRIPTION 61
3.18.3.2 ROCKET LAUNCHER 61
3.18.3.3 MISSILE LAUNCHER 61
3.18.3.4 ALIGNMENT 62
3.18.3.5 ARMAMENT CONTROLS 62
3.18.3.6 EXTENSION AND RETRACTION TIME 62
3.18.4 FLEXIBLE GUNS 63
3.18.5 STORES 63

CONFIDENTIAL

[redacted]

TABLE OF CONTENTS

3.18.6 PASSIVE DEFENSE 63
3.18.7 BORE SIGHTING 63

3.19 FURNISHINGS AND EQUIPMENT 64
3.19.1 ACCOMMODATIONS FOR PERSONNEL 64
3.19.2 MISCELLANEOUS EQUIPMENT 64
3.19.3 FURNISHINGS 65
3.19.4 EMERGENCY EQUIPMENT 65
3.19.5 OXYGEN EQUIPMENT 65
3.19.6 EMERGENCY RESCUE EQUIPMENT 65
3.19.7 SPARE BULBS 65

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT. . 66
3.20.1 AIR CONDITIONING 66
3.20.1.1 IN-FLIGHT AIR CONDITIONING 66
3.20.1.2 GROUND AIR CONDITIONING 67
3.20.2 ANTI-ICING 68
3.20.2.1 ANTI-ICING OF NONTRANSPARENT AREAS. 68
3.20.2.2 ANTI-ICING, DEFROSTING AND DEFOGGING OF TRANSPARENT AREAS 68

3.21 PHOTOGRAPHIC 68

3.22 AUXILIARY GEAR 70
3.22.1 TOWING PROVISIONS 70
3.22.1.1 MAIN LANDING GEAR 70
3.22.1.2 NOSE LANDING GEAR 70
3.22.2 JACKING PROVISIONS 70
3.22.3 MOORING PROVISIONS 70
3.22.4 HOISTING PROVISIONS 70
3.22.5 LEVELING 70
3.22.6 COVERS AND SHIELDS 71
3.22.7 SPECIAL GROUND SUPPORT EQUIPMENT 71

[redacted]

CONFIDENTIAL

TABLE OF CONTENTS

4. SAMPLING, INSPECTION AND TEST PROCEDURES 72

5. PREPARATION FOR DELIVERY 72

6. NOTES 73

6.1 EXPLANATORY INFORMATION 73
6.2 ADDITIONAL INFORMATION 73
6.3 DEFINITIONS 73
6.3.1 COMPLETE PROVISION FOR 73
6.3.2 STRUCTURAL PROVISIONS FOR 73
6.3.3 SPACE PROVISIONS FOR 73
6.3.4 SPACE AND WEIGHT PROVISIONS 73
6.3.5 OTHER DEFINITIONS 74

APPENDIX I-A GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT CONTRACTOR INSTALLED 75

APPENDIX I-B GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT GOVERNMENT INSTALLED 82

APPENDIX I-C CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT CONTRACTOR INSTALLED 83

APPENDIX I-D SPECIAL EQUIPMENT - CONTRACTOR FURNISHED . 89

APPENDIX II DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS 90

APPENDIX III-A INTERCHANGEABILITY LIST 280

APPENDIX III-B REPLACEABILITY LIST 281

CONFIDENTIAL

TABLE OF CONTENTS

ILLUSTRATIONS

Figure 1 THREE VIEW DRAWING 4
Figure 2 PERFORMANCE SUMMARY 6
Figure 3 CENTER OF GRAVITY CHART 13
Figure 4 LIMIT DIVE SPEED 23
Table 1 SUMMARY OF DESIGN FLIGHT CONDITIONS 24
Figure 5 CABIN PRESSURIZATION SCHEDULE 69

CONFIDENTIAL

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The following Request for Alteration (RFA), submitted at TF-102A Nose Section Mock-Up Inspection conducted 28-29 September 1954 at Fort Worth Division of Convair, have been accomplished and are incorporated in this issue of this Model Specification by reference:

RFA No.	Subject
1	Canopy Handles
3	Instrument Panel
4	Fire Warning Indicator
8	Nose Wheel
9	Ejection Seat Handles
10	Radar Control Knob
12	Oxygen Regulator
13	Ejection Clearance
14	Drag Chute Handles
15	Canopy Ejection Knob
17	Radar Scope Shielding
18	Pilot Assist Panel and Communication Panel
20	Pilots' Seats and False Cockpit Floor
30	Overheat Light (Windshield Side Panels)
31	Rain Removal Switch
34	Magnetic Compass Power System
35	Standby Compass Mounting
36	Standby Compass Illumination Switch
37	IFF Control Panel
38	External Canopy Locks
39	A.C. Voltmeter Selector Switch Panel
41	Rudder Pedals
43	Obstruction to AN/ARC-34 Control Panel
45	Edge Lighted Inst. Panel

15 JAN 1955

5 JAN 1

[redacted]

1. SCOPE AND CLASSIFICATION:

1.1 This specification covers the following airplane:

Service Model Designation	TF-102A
Consolidated Vultee Aircraft Corporation Model	8
Number and Places for Crew	Two
Number and Kind of Engine	One Turbo-jet

1.1.1 The primary mission of this airplane is the training of pilots, under all weather conditions and visibility, for the USAF Model F-102 Interceptor Fighter, as well as for other jet propelled, delta wing aircraft.

[redacted]

9.8 '54

[redacted]

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS:

2.1 Applicable specifications listed in the Index of Specifications and Bulletins Approved for Air Force Procurement, dated 1 July 1950, including Supplements through 1 September 1950, shall form a part of this specification.

2.2 ⑧③ The applicable requirements of the following publications with dates as listed below form a part of this specification:

Air Force Specification No. R-1800-E, dated 18 May 1944 and Amendment No. 5 dated 28 May 1945.

Handbook of Instructions for Aircraft Designers Ninth Edition, including revision up to and including 1 April 1950.

Pratt and Whitney Engine Specification No. A-1686 dated 4 February 1954.

2.3 All other applicable specifications and drawings referenced herein, (but not by revision letter, date or amendment), shall be of the issue in effect on 1 September 1950.

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3. REQUIREMENTS:

3.1 CHARACTERISTICS:

3.1.1 THREE VIEW DRAWING: (See Page 4).

3.1.2 PERFORMANCE: For estimated performance see Paragraph 3.1.2.1 (page 5) and Performance Summary (page 6).

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3.1.1 THREE VIEW

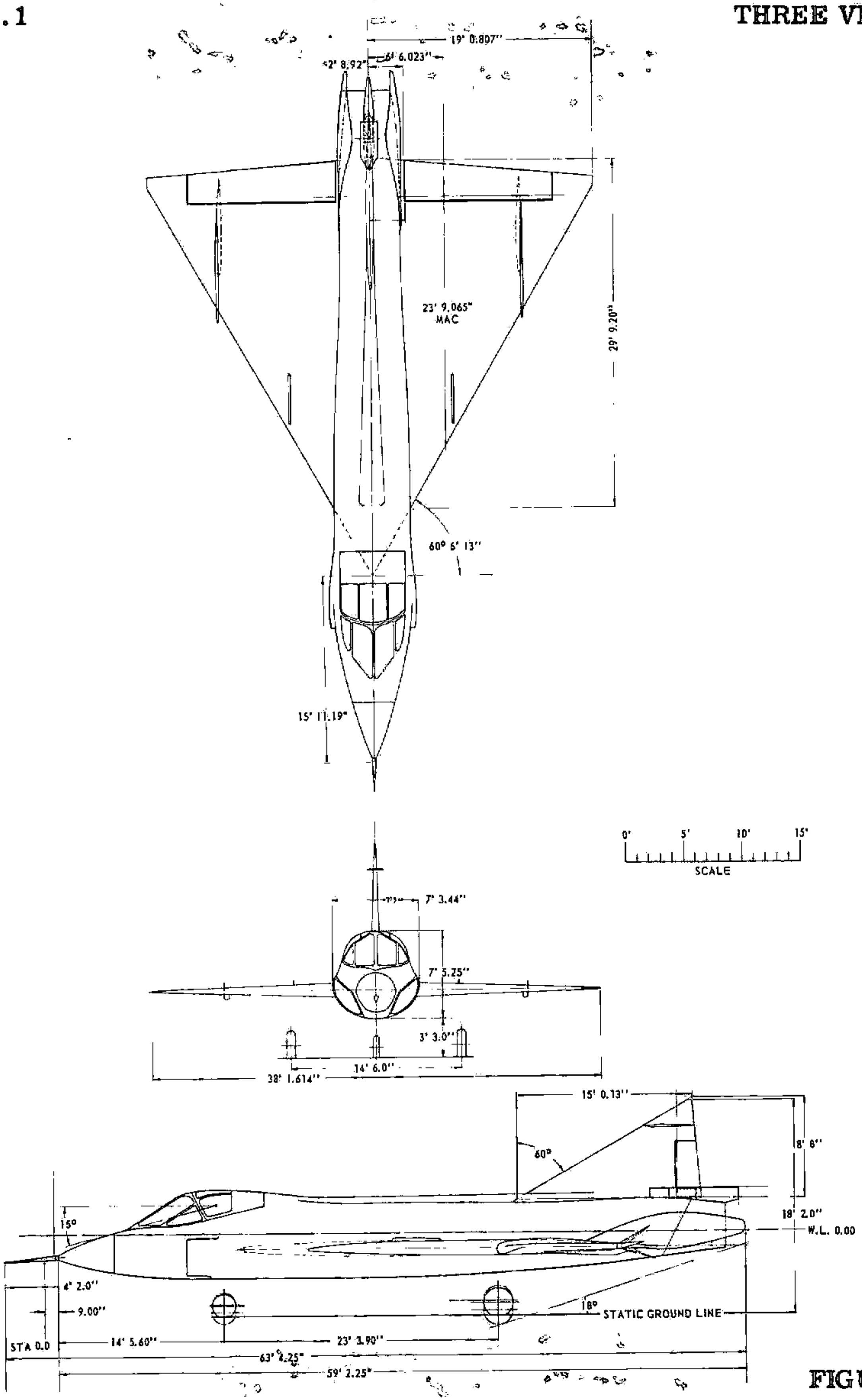

FIGURE 1

5 JAN 1955

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3.1.2.1 ESTIMATED-TABULATED PERFORMANCE

		Pratt and Whitney J57-P-23
Rated Static Thrust at Sea Level	Lb	16,000
Take-Off Weight (full load)	Lb	29,395
Combat Weight*	Lb	26,575
Landing Weight**	Lb	23,435
Fuel (1050 Gal.)	Lb	6,825
High Speed with Military plus Afterburner Power		
35,000 feet	Mach No.	1.0
45,000 feet	Mach No.	0.95
Combat Ceiling with Military plus Afterburner Power (500 ft/min rate of climb)	Ft	47,000
Time to Climb to Altitude with Military plus Afterburner Power (from start of take-off run)		
40,000 feet	Min	5.7
45,000 feet	Min	7.7
Take-Off Without Auxiliary Devices Over 50-Foot Obstacle with Military plus Afterburner Power Take-Off Weight	Ft	3,600
Land Over 50-Foot Obstacles (Landing Weight)		
Without Auxiliary Landing Devices	Ft	4,570
With 14-foot Diameter Drogue Chute	Ft	3,830
Interceptor Mission Performance		
Combat Radius - Area Intercept Mission per MIL-C-5011A (combat 5 min at max power)	Nau Mi	300
Loiter Time - Point Intercept Mission per MIL-C-5011A (combat 5 min at max power)	Hr	1.07

* Weight at start of combat for Point Intercept Mission

** Landing Weight corresponding to Point Intercept Mission. Includes full armament and 20 min reserve fuel at sea level (at V for max endurance)

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NOTE: The above performance is without external fuel tanks installed.

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TF - 102 AIRPLANE - PERFORMANCE SUMMARY

(MILITARY AFTERBURNER POWER)

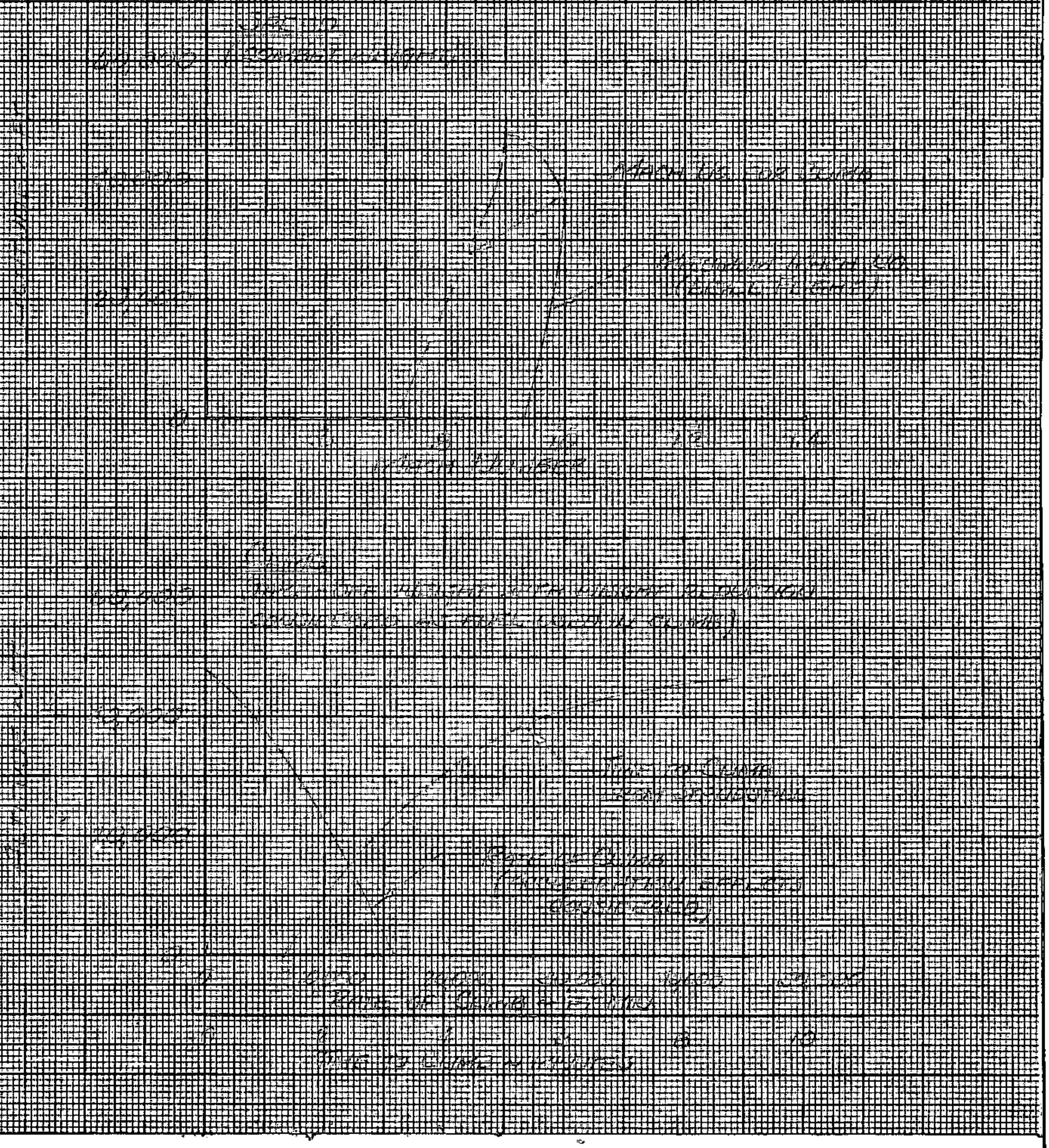

FIGURE 2

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3.1.3 WEIGHTS: For estimated weights see Group Weight Statement - AN9103-D on Pages 8 thru 11. For weight and balance purposes the aircraft is designated as Class 1B as defined in Specification AN-W-11b.

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AN-9103-D
NAME
DATE [redacted]

GROUP WEIGHT STATEMENT
WEIGHT EMPTY

PAGE 8
MODEL TF-102A
REPORT ZD-8-004-A

1	WING GROUP					3,197
2	CENTER SECTION - BASIC STRUCTURE				2,731	
3	INTERMEDIATE PANEL - BASIC STRUCTURE					
4	OUTER PANEL - BASIC STRUCTURE (INCL. TIPS LBS.)					
5	Elevons				385	
6	SECONDARY STRUCTURE ~~(INCL. WINGFOLD MECHANISM LBS.)~~				81	
7	AILERONS (INCL. BALANCE WEIGHT LBS.)					
8	FLAPS - TRAILING EDGE					
9	- LEADING EDGE					
10	SLATS					
11	SPOILERS					
12	SPEED BRAKES					
13						
14						
15	TAIL GROUP					377
16	STABILIZER - BASIC STRUCTURE					
17	FINS - BASIC STRUCTURE ~~(INCL. DORSAL LBS.)~~				332.0	
18	SECONDARY STRUCTURE ~~(STAB. &~~ FINS)				10.0	
19	ELEVATOR (INCL. BALANCE WEIGHT LBS.)					
20	RUDDERS (INCL. BALANCE WEIGHT 0 LBS.)				35.0	
21						
22						
23	BODY GROUP					4,560
24	FUSELAGE OR HULL - BASIC STRUCTURE				2,983	
25	BOOMS - BASIC STRUCTURE					
26	SECONDARY STRUCTURE - FUSELAGE OR HULL				722.0	
27	- BOOMS					
28	- SPEEDBRAKES				63.0	
29	- DOORS, PANELS & MISC.				792.0	
30						
31	ALIGHTING GEAR GROUP - LAND (TYPE:)					1,072
32 33	LOCATION	WHEELS, BRAKES TIRES, TUBES, AIR	STRUCTURE	CONTROLS		
34		363	385	122	870	
35		44	105	53	202	
36						
37						
38						
39						
40	ALIGHTING GEAR GROUP - WATER					
41	LOCATION	FLOATS	STRUTS	CONTROLS		
42						
43						
44						
45						
46	SURFACE CONTROLS GROUP					474
47	COCKPIT CONTROLS				150	
48	AUTOMATIC PILOT					
49	SYSTEM CONTROLS (INCL. POWER & FEEL CONTROLS LBS.)				324	
50						
51	ENGINE SECTION OR NACELLE GROUP					38
52	INBOARD					
53	CENTER					
54	OUTBOARD					
55	DOORS, PANELS & MISC.					
56						
57	TOTAL (TO BE BROUGHT FORWARD)					9,718

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AN-9103-D
NAME __________
DATE __________ [redacted]

GROUP WEIGHT STATEMENT
WEIGHT EMPTY

PAGE 9
MODEL TF-102A
REPORT ZD-8-004-A

1	PROPULSION GROUP					6,318
2			AUXILIARY		MAIN	
3	ENGINE INSTALLATION J-57-P23				5,058	
4	AFTERBURNERS (IF FURN. SEPARATELY)					
5	ACCESSORY GEAR BOXES & DRIVES					
6	SUPERCHARGERS (FOR TURBO TYPES)					
7	AIR INDUCTION SYSTEM				718	
8	EXHAUST SYSTEM				117	
9	COOLING SYSTEM				14	
10	LUBRICATING SYSTEM		29		4	
11	TANKS					
12	COOLING INSTALLATION					
13	DUCTS, PLUMBING, ETC.					
14	FUEL SYSTEM				302	
15	TANKS - PROTECTED					
16	- UNPROTECTED					
17	PLUMBING, ETC.					
18	WATER INJECTION SYSTEM					
19	ENGINE CONTROLS				34	
20	STARTING SYSTEM				42	
21	PROPELLER INSTALLATION					
22						
23						
24	AUXILIARY POWER PLANT GROUP					
25	INSTRUMENTS & NAVIGATIONAL EQUIPMENT GROUP					143
26	HYDRAULIC & PNEUMATIC GROUP					275
27						
28						
29	ELECTRICAL GROUP					569
30						
31						
32	ELECTRONICS GROUP					2,253
33	EQUIPMENT					
34	INSTALLATION					
35						
36	ARMAMENT GROUP (INCL. GUNFIRE PROTECTION LBS.)					597
37	FURNISHINGS & EQUIPMENT GROUP					367
38	ACCOMMODATIONS FOR PERSONNEL				284	
39	MISCELLANEOUS EQUIPMENT				59	
40	FURNISHINGS				10	
41	EMERGENCY EQUIPMENT				14	
42						
43	AIR CONDITIONING & ANTI-ICING EQUIPMENT GROUP					232
44	AIR CONDITIONING				167	
45	ANTI-ICING				65	
46						
47	PHOTOGRAPHIC GROUP					
48	AUXILIARY GEAR GROUP					71
49	HANDLING GEAR				14	
50	ARRESTING GEAR				57	
51	CATAPULTING GEAR					
52	ATO GEAR					
53						
54						
55	MANUFACTURING VARIATION					
56	TOTAL FROM PG. 2					9,718
57	WEIGHT EMPTY					20,543

AN-9103-D
NAME
DATE

GROUP WEIGHT STATEMENT
USEFUL LOAD & GROSS WEIGHT

PAGE 10
MODEL TF-102A
REPORT ZD-8-004-A

1 2	LOAD CONDITION [redacted]				Design		Alternate Rockets	Alternate Ferry
3	CREW (NO. 2) Incl. Parachute				460		460	460
4	PASSENGERS (NO.)							
5	FUEL	Type	Gals.					
6	UNUSABLE	JP-4	11.4		74		74	74
7	INTERNAL	JP-4	1,050		6,825		6,825	6,825
8								
9								
10	EXTERNAL	JP-4	460					2,990
11	External Tank Provisions							76
12	BOMB BAY							
13	External Tank & Pylon - Droppable							266
14	OIL							
15	TRAPPED				25		25	25
16	ENGINE				25		25	25
17								
18	FUEL TANKS (LOCATION)							
19	WATER INJECTION FLUID (GALS)							
20								
21	BAGGAGE							
22	CARGO							
23								
24	ARMAMENT							
25	GUNS (Location)	Fix. or Flex.	Qty.	Cal.				
26								
27								
28								
29								
30								
31								
32	AMMUNITION							
33								
34								
35								
36								
37								
38								
39	INSTALLATIONS (BOMB, TORPEDO, ROCKET, ETC.)							
*40	BOMB OR TORPEDO RACKS							
41	Missiles (6)				801			801
42	Missiles Launchers (6) & Installation				174			174
43	Rockets (24) in Doors				432		432	432
44	Rockets (72) in Pods						1,296	
45	Rocket Pods (6)						280	
46	EQUIPMENT							
47	PYROTECHNICS							
48	PHOTOGRAPHIC							
49								
*50	OXYGEN							
51								
52	MISCELLANEOUS				36		83	36
53								
54								
55	USEFUL LOAD				8,852		9,500	12,184
56	WEIGHT EMPTY				20,543		20,543	20,543
57	GROSS WEIGHT				29,395		30,043	32,727

*If not specified as weight empty.

[redacted]

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AN-9103-D
NAME ____________
DATE ____________

GROUP WEIGHT STATEMENT
DIMENSIONAL & STRUCTURAL DATA

PAGE 11
MODEL TF-102A
REPORT ZD-8-004-A

[redacted]

		Main Floats	Aux. Floats	Booms	Fuse or Hull	Nacelles Inboard	Nacelles Center	Nacelles Outboard
1	LENGTH - OVERALL (FT.)			HEIGHT - OVERALL - STATIC (FT.)				
2								
3	LENGTH - MAX. (FT.) (Not Incl. Airspeed Boom)				39.19			
4	DEPTH - MAX. (FT.)				6.90			
5	WIDTH - MAX. (FT.)				7.40			
6	WETTED AREA (SQ. FT.)							
*7	FLOAT OR HULL DISPL. - MAX (LBS.)							
8	FUSELAGE VOLUME (CU. FT.)		PRESSURIZED			TOTAL		

		Wing	H. Tail	V. Tail
9				
10	GROSS AREA (SQ. FT.)	695.05		68.33
11	WEIGHT/GROSS AREA (LBS./SQ. FT.)	4.58		5.52
12	SPAN (FT.) Actual	38.13		8.42
13	FOLDED SPAN (FT.)			
14				
15	SWEEPBACK - AT 25% CHORD LINE (DEGREES)			
16	- AT 0 % CHORD LINE (DEGREES)	60.10		60.00
**17	THEORETICAL ROOT CHORD - LENGTH (INCHES)			
18	- MAX. THICKNESS (INCHES)			
***19	CHORD AT PLANFORM BREAK - LENGTH (INCHES)			
20	- MAX. THICKNESS (INCHES)			
***21	THEORETICAL TIP CHORD - LENGTH (INCHES)			
22	- MAX. THICKNESS (INCHES)			

23	DORSAL AREA, INCLUDED IN (FUSE.) (HULL) (V. TAIL) AREA (SQ. FT.)	
24	TAIL LENGTH - 25% MAC WING TO 25% MAC ~~H. TAIL (FT.)~~ Vertical Tail (ft.)	13.88

25	AREAS (SQ. FT.) Flaps	L.E.	T.E.	
26	Lateral Controls	Slats	Spoilers	Ailerons
27	Speed Brakes	Wing	Fuse. or Hull	Elevons 67.15
28				
29				

30	ALIGHTING GEAR (LOCATION)	Main	Nose		
31	LENGTH - OLEO EXTENDED - ℄ AXLE TO ℄ TRUNNION (INCHES)	62.5	43.5		
32	OLEO TRAVEL - FULL EXTENDED TO FULL COLLAPSED (INCHES)	10.0	8.0		
33	FLOAT OR SKI STRUT LENGTH (INCHES)				

34	ARRESTING HOOK LENGTH - ℄ HOOK TRUNNION TO ℄ HOOK POINT (INCHES)
35	HYDRAULIC SYSTEM CAPACITY (GALS.) Primary= 3 (approx); Secondary= 4 (approx)

		Location	No. Tanks	****Gals. Protected	No. Tanks	****Gals. Unprotected
36	FUEL & LUBE SYSTEMS					
37	Fuel - Internal	Wing			2	1050
38		Fuse. or Hull				
39	- External	Wing			2	460
40	- Bomb Bay					
41						
42	Oil	Engine			1	
43						
44						

		Fuel in Wings (Lbs.)	Stress Gross Weight	Ult. L.F.
45	STRUCTURAL DATA - CONDITION			
46	FLIGHT	4,095	26,800	8.0
47	LANDING	1,706	23,371	4.5
48				
49	MAX. GROSS WEIGHT WITH ZERO WING FUEL		22,780	10.5
50	CATAPULTING			
51	MIN. FLYING WEIGHT		21,758	10.5
52	LIMIT AIRPLANE LANDING SINKING SPEED (FT./SEC.)			9.0
53	WING LIFT ASSUMED FOR LANDING DESIGN CONDITION (%W)			100.
54	STALL SPEED - LANDING CONFIGURATION - POWER OFF (KNOTS)			
55	PRESSURIZED CABIN - ULT. DESIGN PRESSURE DIFFERENTIAL - FLIGHT (P.S.I.)			11.0
56				
57	AIRFRAME WEIGHT (AS DEFINED IN AN-W-11) (LBS.)			

9.8 '54

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*Lbs. of sea water @ 64 lbs./cu. ft.
**Parallel to ℄ at ℄ airplane.
***Parallel to ℄ airplane.
****Total usable capacity.

[redacted]

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3.1.3.1 Alternate Armament Loading (96 Rockets) Lb 30,043

3.1.3.2 Take-off Gross Weight (Design Useful Load) Lb 29,395

3.1.4 CENTER OF GRAVITY LOCATIONS:

Take-off gross weight, center of gravity location, wheels up:

Aft leading edge of MAC	% MAC 25.7
Above leading edge of MAC	Inches 7.2

Take-off gross weight, center of gravity location, wheels down:

Aft leading edge of MAC	% MAC 25.7
Above leading edge of MAC	Inches 5.8

Extreme positions of center of gravity possible in flight:

	Most Fwd		Most Aft	
	% MAC	Above L. E. MAC (In.)	% MAC	Above L. E. MAC (In.)
Wheels Up	19.5	9.2	----	----
Wheels Down	----	----	28.7	6.9

3.1.4.1 See Figure 3, Page 13, for Chart of Center of Gravity Limitations.

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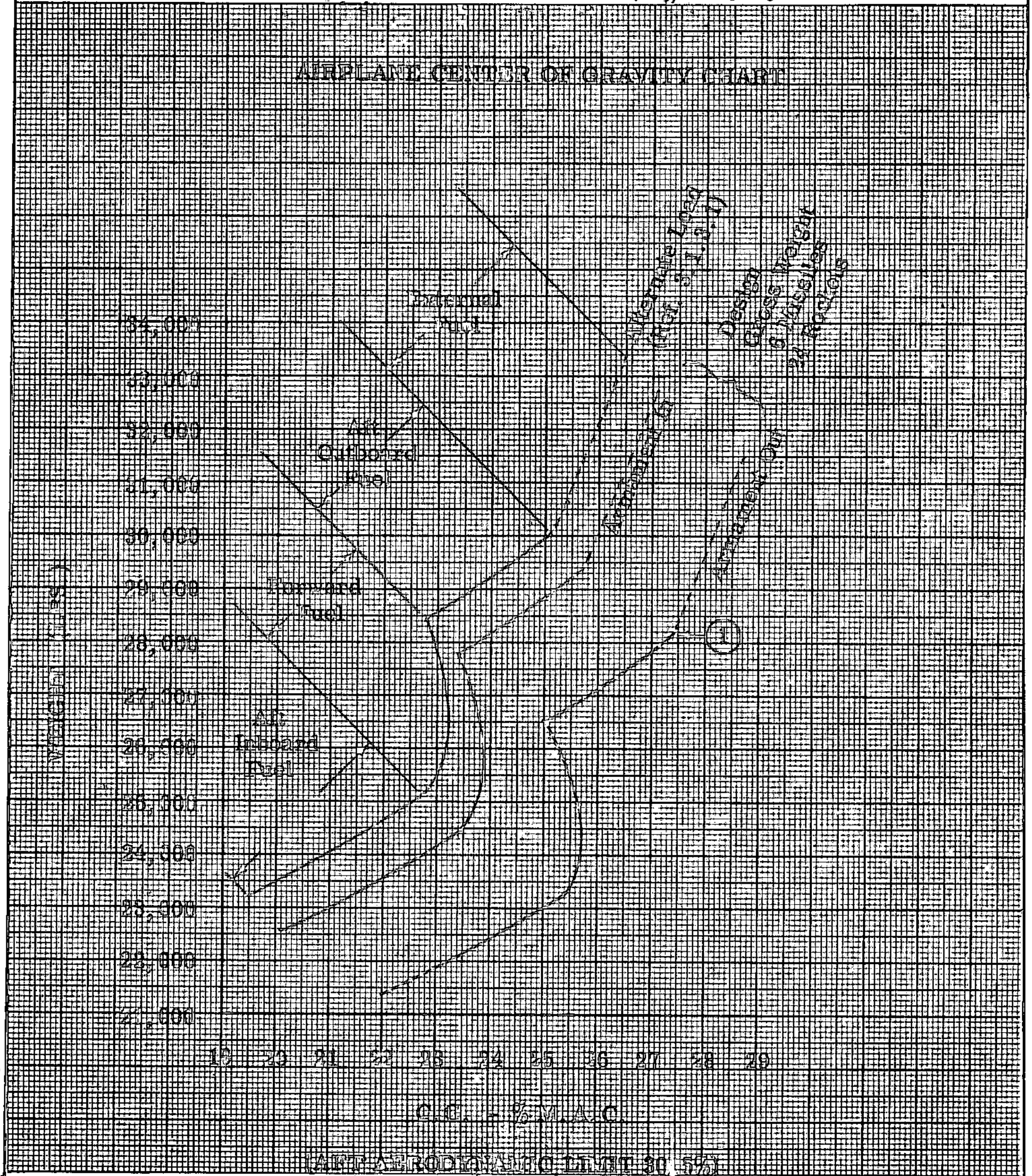

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Figure 3

[redacted]

3.1.5 AREAS (Not to be used for inspection purposes):

Wing area, total, including elevons	695.05 sq ft
Elevon area, aft of hinge line	67.15 sq ft
Vertical Tail area, total	68.33 sq ft
Fin	60.9 sq ft
Rudder, aft of hinge	7.43 sq ft

3.1.6 DIMENSIONS AND GENERAL DATA (Not to be used for inspection purposes):

①

Wing:

Span, maximum (theoretical)	39 ft 0.1 in.
Chord:	
At root	35 ft 7.6 in.
At tip (Theoretical)	0
Mean aerodynamic	23 ft 9.1 in.
Airfoil section:	
Designation	NACA 0004-65 (Mod)
Thickness (percent chord)	4
Incident (degrees):	
At root	0
At tip	0
Sweepback of leading edge	60° 6' 13"
Dihedral	0 degrees
Aspect ratio	2.2
Elevons:	
Span, each	12 ft 10.7 in.
Chord:	
Tip	2 ft 0.4 in.
Root	3 ft 1.9 in.

Tail:

Vertical:	
Airfoil Section:	
Designation	NACA 0004-65 (Mod)
Thickness (percent chord)	4
Sweepback of leading edge	60 degrees
Aspect ratio	1.10

[redacted]

3.1.6 DIMENSIONS AND GENERAL DATA: (Cont)

Height over vertical tail:	
Reference line level	18 ft 2 in.
Three-point position	18 ft 2 in.
Length, maximum (including nose boom)	63 ft 4.25 in.
Distance from 25% MAC to rudder 25% chord Line	20 ft 4.2 in.
Ground angle (Tail down)	18 degrees
Wheel rim size:	
Main wheels	15 inches
Nose wheel	14 inches
Tire size:	
Main wheels	30 x 8.8
Nose wheel	24 x 5.5
Tread of main wheels	14 ft 6 in.
Wheelbase	23 ft 3.9 in.
Vertical travel of axle from extended to fully compressed position:	
Main wheels	10 inches
Nose wheel	8 inches
* Angle between lines joining center of gravity with points of contact of main wheel tires, static deflection of 1 W (front elevation	100° 16' 24"
* Angle of line through center of gravity and ground contact point of main wheel tire to vertical line, reference line level, static deflection of 1 W (side elevation)	33° 4' 20"

* At CG of point (1) on Figure 3, Page 13.

[redacted]

9 8 '54

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3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS: (Not to be used for inspection purposes) Control surface and control movements on each side of neutral position for full movement as limited by stops, are as follows:

Rudder	25°	right	25°	left
Rudder pedals	3.25"	fwd	3.25"	aft
Elevons (as elevators)	25°	up	10°	down
Elevons (as ailerons)	6.7°	up	6.7°	down
Elevon (Control stick)	5"	fwd	9"	aft
Elevon (Control stick)	4"	right	4"	left
Speed brakes	45°	maximum travel		

05 JAN 1955

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3.2 GENERAL:

3.2.1 GENERAL INTERIOR ARRANGEMENT: The interior of the fuselage shall be arranged from nose to tail to provide the following:

(a) A nose section including a radome to house the radar antenna and radar equipment of the fire control system.

(b) A pressurized pilot's compartment with two seats, dual flight controls and equipment. A section to house the nose wheel in the retracted position is located below the floor of this compartment.

(c) An intermediate fuselage section to accommodate the communication and navigation equipment, components of the fire control system and refrigeration equipment.

(d) An armament section to house the missiles and rockets and their displacing gears. Armament provisions in this section shall be as specified in paragraphs 3.2.13.1 and 3.18. The forward wing spar shall attach to fuselage bulkheads in this section.

(e) An accessory section to accommodate miscellaneous hydraulic, pneumatic, electrical and electronic equipment. Through the upper portion of this section passes the engine air intake ducts.

(f) A section to accommodate the turbo-jet engine, the electrical power supply, airframe controls and wells in the lower forward portion to house the main landing gear in the retracted position. The wing main and rear spars shall attach to fuselage bulkheads in this section.

(g) An aft compartment containing the engine afterburner, airframe control system valves and linkages.

3.2.2 ㊵ (96) (132) (133) (134) MATERIALS: Materials shall be in accordance with applicable specifications and shall be selected in accordance with ANA Bulletin 143, except as otherwise noted herein and in Appendix II. Castings shall be designed and inspected in accordance with Specification MIL-C-6021B.

[redacted]

3.2.3 WORKMANSHIP: Workmanship shall conform to high grade aircraft practice as defined by the Contractor's quality control procedures.

3.2.4 PRODUCTION, MAINTENANCE AND REPAIR: In the design of the airplane, consideration shall be given to ease of production, rapid power plant and equipment installation and ease of servicing and maintenance. Special attention shall be given to simplification of accessibility for routine checks of equipment and provisions for general field maintenance at advance bases where elaborate ground equipment is not usually available. Servicing provisions shall be designed to permit maximum utilization of the airplane. Special tools shall be limited to the practicable minimum and shall conform to Specifications MIL-D-8512 and MIL-D-8513.

3.2.5 (145) INTERCHANGEABILITY AND REPLACEABILITY: The component parts of the airplanes shall be interchangeable or replaceable, as the case may be, in accordance with and to the extent required by Specification No. AN-I-21, and shall be manufactured in conformity with the provisions of such specification, as noted in Appendix III herein.

3.2.6 FINISH: The finish for the airplane and parts shall be in accordance with the Contractor's finish specification which shall be in general accordance with Specification MIL-F-7179. In general, exterior paint is not required.

3.2.7 (222) (223) IDENTIFICATION AND MARKING: The airplane and components thereof shall be identified and otherwise marked in accordance with Specifications No. AN-M-13a (1) and 98-24105S (3).

3.2.8 EXTREME TEMPERATURE OPERATION: The aircraft as a whole, including aeronautical equipment, shall be so constructed that it will function satisfactorily in any or all temperature conditions that will be encountered. A ground temperature of -65°F has been established as the minimum temperature at which the aircraft shall operate.

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3.2.8 EXTREME TEMPERATURE OPERATION (Cont)

The complete airplane, except the transparent portion of the pilots' enclosure, shall be capable of operating at a maximum stagnation temperature of 160°F (140°F boundary layer) based on an Air Force "Standard" day. The transparent portion of the pilots' enclosure shall be designed to a stagnation temperature of 205°F (194°F boundary layer) based on an Air Force "hot" day. The above requirements are as outlined in Convair Report No. ZU-8-027.

3.2.9 CLIMATIC REQUIREMENTS: The aircraft and its equipment shall not be adversely affected by other climatic conditions incident to the above temperature range, and shall be capable of transfer from one climate to another without penalty of extensive modification and adjustment.

3.2.10 LUBRICATION: Lubrication of the airplane shall be in accordance with Specification No. MIL-L-6880A.

(249)

3.2.11 STANDARD PARTS: The use of standard parts shall be in accordance with the requirements of Paragraph 3.2.2.

㉑ ㉜
thru
㉗ (287)

3.2.11.1 Bearings shall meet the requirements of the applicable revision of the Handbook of Instructions for Aircraft Designers, except as noted in the specifications for bearings listed in Air Force Bulletin No. 59, dated 1 January 1951 and deviations of Appendix II.

㉘ ㉙ (55)
(58) (141) (142)
(146)

3.2.12 CREW: The crew shall consist of one student and one instructor seated side by side. The student station shall be located on the left side of the pilots' compartment.

15 OCT 1954

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3.2.13 EQUIPMENT INSTALLATION:

3.2.13.1 ARMAMENT: Complete provisions shall be made for mounting and firing the following weapons:

Rocket	2.75" FFAR	24
Guided Missile	GAR-1	6

OR

Rocket	2.75" FFAR	24
Guided Missile	GAR-1B	6

OR

Rocket	2.75" FFAR	24
Guided Missile	GAR-1	3
Guided Missile	GAR-1B	3

3.2.13.1.1 ARMAMENT - ALTERNATE ARRANGEMENT: Provisions shall be made for carrying the following alternate armament arrangement.

Rocket	2.75" FFAR	96
Guided Missile		0

Rocket tube packages and other accessories for utilizing this alternate arrangement shall be provided.

3.2.13.2 COMMUNICATION AND NAVIGATION EQUIPMENT: See Section 3.17.

3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION: The equipment and furnishings listed in Appendices I-A, I-B, and I-C of this model specification, shall be installed in the quantity and under the conditions specified herein.

15 OCT 1954

[redacted]

3.3 AERODYNAMICS:

(159) (160) (204)

3.3.1 GENERAL: The airplane shall be designed and constructed to provide the maximum surface smoothness and trueness of aerodynamic contour that are consistent with rapid and economical manufacturing techniques and that are required for high performance.

3.3.2 STABILITY AND CONTROL:

3.3.2.1 The stability and controllability of the airplane shall be in accordance with Specification No. 1815B, except as noted in Appendix II.

(148) thru (156) (158)

3.3.2.2 PERMISSIBLE AERODYNAMIC CENTER OF GRAVITY: The aft center of gravity limit of the airplane shall be as shown on Figure 3 , Page 13.

3.3.2.3 It shall be possible to open the speed brakes in two seconds maximum from fully closed position to the position corresponding to 90% of nominal hydraulic system force, which corresponds to 2700 psi in the actuating cylinder. It shall be possible to open the brakes to any intermediate position.

3.3.2.4 The longitudinal deceleration provided by the speed brakes shall be at least 0.19g at 400 knots IAS.

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3.4 STRUCTURAL DESIGN CRITERIA: Stress analysis criteria shall be as set forth in Convair Report No. ZU-8-027.

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3.4.1 LIMIT FLIGHT LOAD FACTORS:

3.4.1.1 Combat Gross Weight . . . . 26,800 lb

Maneuver: Positive 6.0 g symmetrical for all speeds and altitudes. (For other conditions see Table I, page 24, herein)

3.4.1.2 Maximum Take-off Weight . . . . 32,859 lb

Maneuver: Positive 3.0g, Negative -1.0g (See Table I, page 24 herein)

3.4.1.3 Minimum Flying Weight . . . . 21,758 lb

3.4.2 LIMIT GROUND LOAD FACTORS:

Taxiing:

Ground Maneuver @ Take-off (at maximum take-off weight of 32,859 lb) 2.0g

Landing:

Ground Landing (at normal take-off weight of 29,530 lb). . . . 2.0g

Ground Landing (at normal landing gross weight of 23,371 lb) . . . 3.0g

3.4.3 LIMIT DIVING SPEED: See Figure 4, Page 23, for limit diving speeds.

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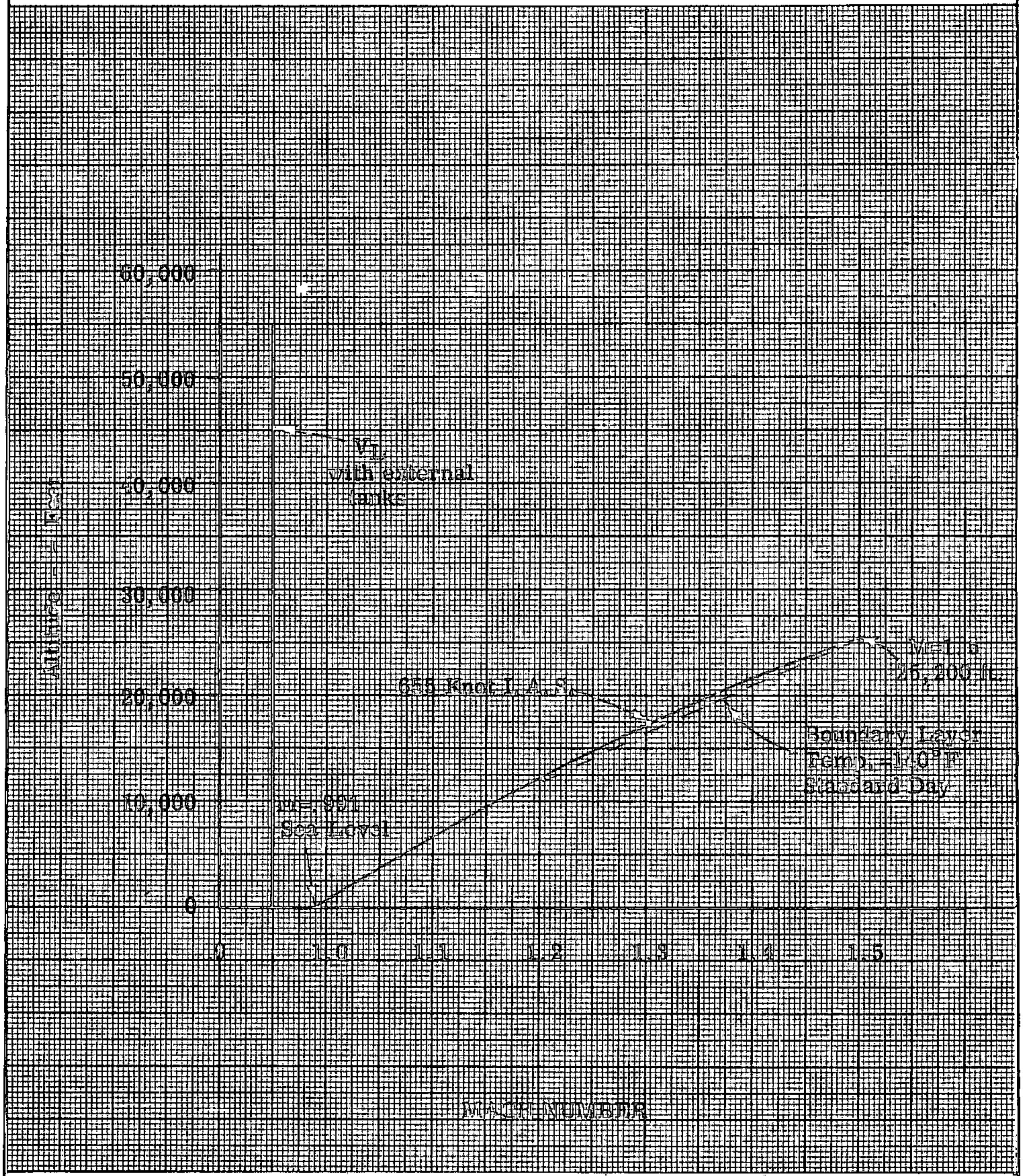
LIMIT DIVE SPEED



CONFIDENTIAL

Figure 4

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SUMMARY OF DESIGN FLIGHT CONDITIONS					
Configuration	Maneuver	Sym. Load Factor "g"	Min. Design Altitude	Design Speed Range	Remarks
Clean Airplane	Symmetrical Pullout	0 to + 6.0 -3 to 0	Sea Level 12,000 ft.	C_L=0.75 to V_L C_L=0.75 to V_L	
	Gust - Symmetrical & Lateral		Sea level	0 to V_H	$50\sigma^{1/2}$ ft/sec sharp edge gust
	Rolling pullout	0 to +3.9	12,000 ft.	C_L=0.75 to V_L	Full available aileron
	Rudder induced maneuvers	1.0	12,000 ft.	270 Kts to V_L	Rudder rapidly applied Limited to automatic control authority or to 180 pound pedal force.
External Fuel Tanks on Tanks full (max. take-off wt.)	Symmetrical pullout	-1.0 to +3.0	12,000 ft.	C_L=0.75 to M=.95	
Tanks empty	Symmetrical pullout	-3.0 to +5.33	12,000 ft.	C_L=0.75 to M=.95	
Full & empty	Symmetrical & Lateral gust		Sea level	0 to Cruise speed-Tanks on	$50\sigma^{1/2}$ ft/sec sharp edge gusts.
Armament Extended	Symmetrical Maneuver	-1.0 to +3.0	Sea level	C_L=.75 to V_L	
	Steady Sideslip	+1.0	12,000 ft.	C_L=.75 to V_L	Max. available with 180 pound pedal force
Landing Gear Extended	Symmetrical Pullup	0 to 2.5	Sea level	0 to 270 kts	
	Rudder induced Maneuver	1.0	Sea level	0 to 270 kts	Full rudder rapidly applied

TABLE I

[redacted]

3.5 WING GROUP:

3.5.1 (82) DESCRIPTION AND COMPONENTS: The wing shall be a delta wing in planform and shall include two elevons, integral fuel tanks and provisions for attachment of main landing gear and other equipment.

3.5.2 CONSTRUCTION:

3.5.2.1 The wing shall be basically of full cantilever, stressed skin, high strength aluminum alloy construction employing spanwise spars of either or both forged and built-up shear web type and built-up shear-web type chordwise ribs and bulkheads.

3.5.2.2 A portion of the wing interspar area outboard of the fuselage shall be designed for integral fuel tanks.

3.5.2.3 ⑥ The wing shall incorporate "wing fences," cambered leading edges, space and structural provisions for "non-evaporative, running - wet" type thermal anti-icing.

3.5.2.4 Removable reflex type wing tips shall be provided.

3.5.2.5 The wing shall include space and structural provisions to accommodate the installation of external fuel tank kits described in Section 3.12.9.4 herein.

3.5.3 ELEVONS: Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be riveted metal torque box and rib construction with metal covering. The elevon restraint shall be sufficiently rigid to prevent flutter and/or buzz.

Differential motion (as ailerons)	None
Distance from plane of symmetry to centroid of elevon area	8 ft 8.4 in.
Type of balance	None
Tabs	None

3.5.4 LIFT AND DRAG INCREASING DEVICES: None included as a portion of the Wing Group. See paragraphs 3.6.4.1 and 3.7.1.6.

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3.6 TAIL GROUP:

3.6.1 DESCRIPTION AND COMPONENTS: The tail group shall consist of a single vertical fin and rudder.

3.6.2 STABILIZER: Not applicable.

3.6.3 ELEVATOR: Not applicable.

3.6.4 ⑥ FIN: The fin shall be basically of riveted cantilever, high strength aluminum alloy construction attached to the fuselage and including provision for attachment of the rudder. The structure shall consist of forged spars and built-up shearweb ribs with stressed metal covering. The fin shall have space and structural provisions for leading edge "non-evaporative, running-wet" type anti-icing. The tip shall be electrically isolated by plastic material as required to satisfy the antenna requirements.

3.6.4.1 DROGUE PARACHUTE: A drogue parachute shall be installed at the base of the vertical tail to provide additional or auxiliary braking power for use on ice-covered runways or when landing on short runways.

3.6.5 RUDDER: The rudder shall be of metal honeycomb construction with metal covering. Trim tabs are not required. Balancing of rudder is not required. The rudder restraint shall be sufficiently rigid to prevent flutter and/or buzz.

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3.7 BODY GROUP:

3.7.1 FUSELAGE:

3.7.1.1 DESCRIPTION: The fuselage shall be arranged as specified in paragraph 3.2.1.

3.7.1.2 ㊴ CONSTRUCTION: The fuselage shall be basically of riveted, high strength aluminum alloy construction with bulkheads and beltframes and stressed-skin metal covering. Magnesium skins may be used where practicable. Corrosion and heat-resisting material shall be used where required in the engine section.

3.7.1.3 CREW AND PERSONNEL STATIONS:

3.7.1.3.1 ⑪ ⑫ The pilots' compartment shall include two ejection seats and dual flight controls. The power plant and accessory controls and instruments, flight instruments and armament controls are as specified herein. The instrument panel for both the student and instructor shall accommodate the pilot's display component of the fire control system. An optical sight shall be mounted directly above each instrument panel. The cockpit shall be arranged as agreed to by the mock-up board inspection.

3.7.1.3.2 The pilots' compartment shall be designed to be pressurized as specified in paragraph 3.20.1.1.1.

3.7.1.3.3 Separate ladders (ground handling equipment) shall be required for the student and instructor to enter and leave the airplane.

3.7.1.3.4 (290) (293) The pilots' compartment shall be equipped with a hinged canopy, which shall be manually operated for normal entrance and exit and which shall be capable of being jettisoned by means of a canopy remover actuated as a part of the seat ejection sequence for emergency exit in flight. An alternate means shall be provided for jettisoning the canopy in a manner that will not accomplish the pre-ejection arming of either seat. Additional provisions are installed for jettisoning of cockpit canopy externally. The external provisions are located on the left hand side of the fuselage to permit ground personnel to jettison the canopy when the aircraft is in either "wheels-up" or "wheels-down" position. An instruction stencil shall be installed adjacent to the external controls. External means for actuating the canopy latching mechanism shall be provided.

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15 OCT 1953

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3.7.1.3.5 The maximum practicable hemispherical visibility shall be provided to either side of the forward line of sight, and to either side above and below the line of sight. The forward and downward visibility over the nose shall be not less than 15° to the wing chord plane.

3.7.1.3.6 ⑧ ⑨ The pilots' windshield shall be fabricated from tempered glass in accordance with Specification No. MIL-G-8602 for flat glass and MIL-G-7767 for curved glass, except for whatever modification may be necessary to incorporate electrical anti-icing and defogging provisions. The pilots' canopy shall be fabricated from transparent material in accordance with AN-P-45, except as noted in Appendix II.

3.7.1.3.7 The cockpit configuration shall be arranged to accommodate two ejection seats approved by WADC.

3.7.1.4 CARGO COMPARTMENTS: Not applicable.

3.7.1.5 EQUIPMENT COMPARTMENTS: Provisions shall be made to install the equipment as specified in paragraph 3.2.1. Ready access shall be provided for all components requiring adjustment and preflight checks.

3.7.1.6 SPEED BRAKES: Two speed brake panels shall be provided. These shall be located in the fin island stub and shall house the drogue chute. The brakes shall be hydraulically operated with no preselected positioning provisions. Locks shall be provided for the closed position only. Means shall be provided to hold the speed brake doors open to prevent inadvertent actuation of the doors during maintenance.

3.7.1.7 ROCKET AND MISSILE BAYS: Provisions to accommodate the armament as specified in Paragraph 3.2.13.1, shall be incorporated in the lower portion of the fuselage forward of the main landing gear.

3.7.1.8 WHEEL WELLS: Provision shall be made to house the nose wheel and portion of the two main wheel landing gear units in the fuselage.

3.7.1.9 ACCESSORY COMPARTMENT: Provisions shall be made to accommodate the installation of miscellaneous hydraulic, pneumatic, electrical and electronic equipment in the accessory compartment, which shall be located between the rocket bay and the main wheel wells.

3.7.2 HULL: Not applicable.

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3.8 ALIGHTING GEAR:

⑮ ⑯ ⑰ (205)

3.8.1 GENERAL DESCRIPTION AND COMPONENTS: The landing gear shall be of the retractable, tricycle type, consisting of a nose gear unit and two main gear units.

3.8.2 MAIN LANDING GEAR:

3.8.2.1 DESCRIPTION: The main landing gear shall consist of two units attached to the wing structure and retracting into wells in the wing and fuselage. Each unit shall include a shock absorber strut and one wheel, tire, tube and brake.

3.8.2.2 (139) (140) WHEELS, BRAKES AND BRAKE CONTROL SYSTEMS: The main wheels shall be 30 x 8.8, Type VII and shall be equipped with pneumatic brakes. The brakes shall be actuated by means of toe controls which form an integral part of the pilots' rudder pedals. The brake system shall be in accordance with Specification No. AN-B-2, except as noted in Appendix II. Anti-skid devices are not required.

3.8.2.3 TIRES AND TUBES: The main wheel tires and tubes shall be 30 x 8.8, Type VII.

3.8.2.4 (221) SHOCK ABSORBERS: Each main landing gear unit shall include one shock absorber strut designed in accordance with Specification No. 40228J (4) and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

3.8.2.5 ⑲ ㊷ ㊿ (271) RETRACTING, EXTENDING AND LOCKING SYSTEMS: The main landing gear shall be hydraulically retracted and extended by means of controls located convenient to the student and instructor. Safety devices shall be provided to prevent inadvertent retraction of the main landing gear when the airplane is on the ground. Positive mechanical locks shall be provided in both the extended and retracted positions. (Retracted gear is locked by doors.)

3.8.2.6 ⑳ DOORS AND FAIRINGS: Hinged doors and fairings shall be provided to cover the main landing gear wells in the fuselage and wing.

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3.8.2.7 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the main landing gear units requiring inspection, maintenance and servicing including lubrication, and for removal and replacement of parts subject to wear in service.

3.8.3 AUXILIARY LANDING GEAR (Tail Wheel): Not applicable.

3.8.4 (14) AUXILIARY LANDING GEAR (Nose Wheel):

3.8.4.1 DESCRIPTION: The nose landing gear shall consist of a single steerable unit attached to the fuselage structure and retracting into a well in the nose. This unit shall include a shock absorber strut, steer damp unit and one wheel, tire and tube.

3.8.4.2 WHEEL: The nose wheel shall be 24 x 5.5, Type VII.

3.8.4.3 TIRE AND TUBE: The nose wheel tire and tube shall be 24 x 5.5, Type VII EHP.

3.8.4.4 (221) SHOCK ABSORBER: The nose landing gear unit shall be equipped with one shock absorber strut designed in accordance with Specification No. 40228J (4), and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

3.8.4.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS: The nose landing gear unit shall be hydraulically retracted and extended by means of the controls specified in paragraph 3.8.2.5. Safety devices shall be provided to prevent inadvertent retraction of the nose landing gear when the airplane is on the ground. A positive mechanical lock shall be provided in both the extended and retracted positions.

3.8.4.6 (20) DOORS AND FAIRINGS: A hinged door shall be provided to enclose the nose wheel well in the nose of the fuselage.

3.8.4.7 STEERING CONTROL: Provision shall be made for hydraulically steering the nose wheel by means of either set of rudder pedals acting together. The nose wheel shall be steerable through 50° right or left. At 55° right or left the steer damp unit shall automatically disengage and permit swiveling through 360°.

9.8 '54

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3.8.4.8 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the nose landing gear unit requiring inspection, maintenance and servicing, including lubrication, and for removal and replacement of parts subject to wear in service.

3.8.5 IN FLIGHT OPERATING CONDITIONS: Positive operation shall be available during level flight at all speeds up to $V_c = 270$ knots, and during accelerated flight operation ($n_z = 2.0$) up to $V_c = 240$ knots.

3.9 ALIGHTING GEAR (Water Type): Not applicable.

15 OCT 1954

CONFIDENTIAL

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3.10 ㊸ (57) SURFACE CONTROL SYSTEM:

3.10.1 ㊹ ㊻ ㊼ (56) (157) PRIMARY FLIGHT CONTROL SYSTEM: The primary flight control system shall be an irreversible, full-hydraulic power system, including artificial feel and trimming devices. The irreversible power actuators shall also serve as the surface actuators during automatic flight, and shall be designed to function in conjunction with the fire control system to provide satisfactory airplane performance during all automatic flight operations. A dual hydraulic power system shall be provided as described in paragraph 3.15.1. The control system shall be in accordance with Handbook of Instructions for Aircraft Designers (HIAD), except as noted in Appendix II.

3.10.1.1 ㊽ FLIGHT STATION CONTROLS: The cockpit elements of the flight control system shall include dual rudder pedals and dual control sticks.

3.10.1.1.1 The student's and instructor's control sticks shall each include complete provisions for the installation of double grip type control stick heads. The control sticks heads shall be contractor furnished for those aircraft not requiring installation of a fire control system. For those aircraft which require a fire control system the control stick heads shall be furnished as a part of the fire control system. (See Para. 3.17.4.7 1)

3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS:

3.10.2.1 LIFT AND DRAG INCREASING DEVICE SYSTEMS: Duplicate provisions for the release and jettison of the drogue parachute shall be installed in the cockpit conveniently located for use by each pilot.

3.10.2.2 SPEED BRAKES: Provision shall be made to extend and retract the speed brakes by a switch located on each throttle control lever. Instructor's switch shall override the student's switch.

3.10.3 (289) TRIM CONTROL SYSTEMS: The primary flight control system shall include trimming devices operable by the student through trim switches in the cockpit. The instructor shall have elevon trim control only. When on automatic flight control system, the elevator trimming device shall automatically operate in such a manner as to prevent objectionable control stick and surface motion when the automatic control system is disengaged. Provisions shall be made, for the student only, to automatically place the trim system in take-off configuration by the operation of a single control located in the cockpit. Achievement of take-off trim shall then be indicated by a green light.

15 JAN 1955

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3.10.4 AUTOMATIC FLIGHT CONTROL DEVICES: Automatic flight control devices shall consist of the following systems.

3.10.4.1 PITCH AND YAW DAMPER SYSTEM: The function of this system shall be to augment the airplane dynamic stability. This system is applicable for all modes of operation (i.e. manual or automatic fire control) except direct manual. Means shall be provided available to either pilot to disengage the pitch and yaw damper system and switch to the direct manual mode of flight control.

3.10.4.2 PILOT ASSIST SYSTEM: A separate pilot assist system will not be provided. This mode of operation will be included in the automatic flight control system (AFCS) (Ref. Paragraph 3.10.4.4).

3.10.4.3 PITCH G-LIMITER: The function of this system shall be to sense the approach of excessive normal load factors and shut-off the pitch and yaw damper system and automatic fire control system in time to prevent structural damage to the airplane.

3.10.4.4 AUTOMATIC FLIGHT CONTROL SYSTEM: Complete provisions for the automatic flight control system (AFCS) portion of the fire control system shall be incorporated so that when installed, the system will permit automatic flight control of the airplane during the interception phase of attack following radar lock on. This system shall also independently provide either pilot with a means of holding the airplane attitude constant for short periods of time. This mode of operation shall be available to either pilot through manually controlled switches during normal flying (i.e., radar turned off) or the search phase.

3.10.5 MODES OF FLIGHT CONTROL: For the purpose of this specification the modes of operation shall be as follows:

3.10.5.1 DIRECT MANUAL: The direct manual mode of operation shall consist of control surface inputs by the pilots only. This is not intended to be a normal mode of operation.

5 JAN 1955

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3.10.5.2 MANUAL: The manual mode of operation shall consist of simultaneous control surface inputs by either pilot and the pitch and yaw damper system.

3.10.5.3 PILOT ASSIST (MG-9): In the pilot assist mode of operation the rudder inputs are as in the manual mode and the elevon inputs originate from the pitch damper and pilot assist systems.

3.10.5.4 AUTOMATIC FIRE CONTROL: In the automatic fire control mode of operation the rudder inputs are as in the manual mode and the elevon inputs originate from the fire control computer.

5 JAN 1955

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CONFIDENTIAL

3.11 (84) (92) (96) (98) ENGINE SECTION: The aft section of the fuselage shall be designed to accommodate the turbo-jet engine specified herein. The engine shall be shrouded and insulation shall be provided as necessary for cooling and fire protection purposes.

3.11.1 DESCRIPTION AND COMPONENTS: The engine section is located in the aft section of the fuselage and designed to accommodate the specified turbo-jet engine.

3.11.2 CONSTRUCTION: See paragraph 3.7.1.2, Fuselage Construction.

3.11.3 ENGINE MOUNTS: Provision shall be made to mount the specified turbo-jet engine.

3.11.4 VIBRATION ISOLATORS: Vibration isolators are not required.

3.11.5 (91) (95) (96) (132) FIREWALLS: A vertical athwartship airframe firewall shall not be required. For fire protection the engine shall be encased within an insulated fire resistant cannular shroud extending from the engine firewall aft. A longitudinal vertical firewall shall be installed between the wing fuel tanks and engine compartment from bulkhead 481 to 553 between the upper and lower wing attach angles. Firewalls may be constructed of titanium or titanium alloys. Fire resistant shrouds shall be installed around the fuel shut-off valves, and provided with overboard drains.

3.11.6 COWLING AND COWL FLAPS: Not required.

3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE: Removable panels and hinged doors shall be provided as required for access to the engine installation for inspection and maintenance.

3.11.8 (97) FIRE ACCESS DOORS: A spring-loaded fire access door shall be provided in the fuselage to accommodate rapid insertion of a ground fire extinguisher nozzle.

CONFIDENTIAL

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3. 12 PROPULSION:

3. 12. 1 GENERAL DESCRIPTION AND COMPONENTS: The propulsion group includes the turbo-jet engine specified below, the required accessories, and related systems. Engine inlet screen will not be required.

3. 12. 2 MAIN PROPULSION UNIT:

3. 12. 2. 1 The airplane shall be equipped with one Pratt & Whitney J57-P-23 turbo-jet engine in accordance with Pratt & Whitney Specification No. A-1686, and rated at 16, 000 pounds of thrust, static at sea level. The engine shall be in accordance with Pratt & Whitney Drawing No. 229001, no change ltr. (Drawing No. 208301 change ltr. BG-2 to be used until Dwg. No. 229001 becomes available). Any future revisions that affect materially the J57-P-23 installation shall be submitted to the Wright Air Development Center and the Contractor, in the form of Engineering Change Proposal, for approval.

3. 12. 3 AUXILIARY PROPULSION UNIT: Not required.

3. 12. 4 ENGINE-DRIVEN ACCESSORIES: Two hydraulic pumps and one tachometer generator shall be installed on and driven by the engine. A constant speed accessory drive shall be driven by the engine through a gear and drive shaft arrangement.

3. 12. 5 AIR INDUCTION SYSTEM: Air inlets, with boundary layer air ducts and plows shall be located on each side of the fuselage adjacent to the pilots' compartment with ducts extending aft to the engine. The air inlet duct lips shall have provisions for anti-icing as specified in paragraph 3. 20. 2. 1.

3. 12. 6 EXHAUST SYSTEM: The engine shall be furnished complete with exhaust system, including afterburner with a two position, flap type nozzle.

3. 12. 7 COOLING SYSTEM: Adequate cooling for the engine, engine accessories, aircraft equipment, components and structure shall be provided.

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(101)

9. 8 '54

CONFIDENTIAL

3.12.7.1 In addition to the cooling air, supplementary protection is afforded the fuselage structure from overheat by the insulated shroud. (Reference paragraph 3.11 and 3.11.5).

3.12.8 LUBRICATING SYSTEM:

(102)

3.12.8.1 (89) (103) thru (108) DESCRIPTION AND COMPONENTS: The spcified engine shall be furnished complete with lubricating system, including oil tank, oil-fuel heat exchanger (oil cooler), pumps, lines, strainer and valves. An additional air/oil cooler shall be provided by the Contractor to maintain required oil temperature.

3.12.8.1.1 A suitable access door shall be provided for oil tank servicing.

(81) (90)

3.12.9 FUEL SYSTEM:

(112)

3.12.9.1 (109) (110) (115) DESCRIPTION AND COMPONENTS: The fuel system shall include tanks, lines, pumps, valves and controls. The system shall be designed for the use of fuels conforming to Specification No. MIL-F-5624A, Grade JP-4. The fuel system shall include the provisions specified in paragraph 3.5.2.5 to accommodate the installation and use of external fuel tanks. The system shall be placarded as to use of MIL-F-5572 gasoline as an emergency fuel and airplane performance limitations shall be included thereon.

3.12.9.2 (114) PUMPS: Two alternating current, electric motor-driven fuel booster pumps, conforming to Specification MIL-P-5238, shall be provided in the wing fuel tanks. Other pumps shall be as furnished with specified engine.

3.12.9.3 (77) (78) (85) (86) (87) (93) TANKS:- (Fixed): Two fuel tanks (one in each wing) consisting of three inter-connected compartments each, with a total net capacity of 1050 gallons (±2%) shall be provided as an integral part of the wing structure.

9.8 '54

CONFIDENTIAL

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3.12.9.4 TANKS - (Jettisonable): Space and structural provisions shall be made to accommodate the installation and functioning of jettisonable external fuel tank kits, designed to accommodate use of the standard USAF 225 gal tanks, AF Drawing X53J9555. The kits shall include the pylons, ejector, attaching and release mechanism, wiring, switches, plumbing and air pressure lines. The provisions shall accommodate the installation of one tank kit, on the lower surface of the wing on both the left and right hand side. Means shall be provided to automatically shut-off the transfer pressurization system when the tanks are empty. The pylons and tanks shall be jettisonable, at the pilots' option.

3.12.9.5 (88) (111) (113) VENT SYSTEM: The fuel tanks shall be vented in a manner consistent with fuel tank pressurization requirements. The vent system shall include the required lines, fittings, valves and equipment.

3.12.9.6 (71) thru (76) PIPING AND FITTINGS: Aluminum alloy fuel lines may be used throughout the fuel system. A shut-off valve protected by a fire resistant shroud, shall be provided at each wing tank outlet. All piping and connections in the fuel system shall be in accordance with applicable specifications and installed in accordance with the requirements of the HIAD, except as specified in Appendix II.

3.12.9.7 VALVES: Valves shall be provided as required and shall be in accordance with applicable specifications.

3.12.9.8 (116) STRAINERS AND FILTERS: A No. 8 mesh screen shall be installed in the fuel line near the engine.

3.12.9.9 (80) (277) (280) (281) QUANTITY GAGES AND FLOWMETERS: A single instantaneous rate expanding scale type flowmeter shall be provided for the turbine jet portion only. A fuel quantity gage compensated characterized type which is in general accord with Specification MIL-G-7818 except as noted in Appendix II, shall be provided. The quantity gage shall be installed in accordance with Specification MIL-G-7940, except as noted in Appendix II. Individual compartment reading by selection switching arrangement shall not be required. The fuel gage in normal position shall totalize all fuel in the integral tanks. Selective switching shall permit the gage to indicate quantity of fuel in either the #3 compartment left hand wing tank or the #3 compartment right hand wing tank.

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3.12.9.9.1 LOW LEVEL WARNING: A fuel low-level warning shall be provided, which is actuated by means other than the gage.

3.12.9.10 (94) DRAINAGE PROVISIONS: Provision shall be made to drain fuel from the tanks.

3.12.9.11 FUEL EVAPORATION AND TRANSFER CONTROL: Air shall be bled from the engine compressor section and shall be used to pressurize the fuel tanks to reduce fuel evaporation and to provide fuel transfer.

3.12.9.12 (79) REFUELING PROVISIONS: Pressure refueling provisions shall comply with the requirements set forth in Memorandum Report No. MCREXP-524-3006 with the exception of suction defueling as noted below, and deviations noted in Appendix II.

3.12.9.13 (89) (232) thru (286) DEFUELING PROVISIONS: The fuel booster pumps shall be used for defueling on the ground.

3.12.10 WATER INJECTION SYSTEM: Not applicable.

3.12.11 (51) (52) PROPULSION SYSTEM CONTROLS: A power control lever shall be provided on the left hand console for the student, another on the right hand console for the instructor and connected to the power lever on the specified engine.

3.12.11.1 A switch shall be provided on both the student's and instructor's throttle quadrant which shall permit either pilot to independently switch to the emergency regime in the engine fuel system. For normal regime of the fuel system, both switches must be in the normal position.

3.12.12 STARTING SYSTEM: The starting system shall include an air turbine starter requiring an external source of compressed air. The main engine starting controls shall be located for use by the student. The starter pressure regulating and shut-off valve shall not be required on the aircraft.

3.12.13 PROPELLER: Not applicable.

3.12.14 ROCKET PROPULSION SYSTEM: Not required.

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3.13 AUXILIARY POWER PLANT: The airplane shall be designed to receive compressed air for ground starting from a type MA-1 power unit, or equivalent, except as modified by paragraph 3.12.12 herein.

3.13.1 A quick disconnect fitting located in the right hand wheel well, shall be provided for use with the ground compressor. This fitting is used for connecting air duct from ground compressor for engine starting.

9.8 '54

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CONFIDENTIAL

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT:

3.14.1 INSTRUMENTS:

㊾ (117) (121)

3.14.1.1 STUDENT INSTRUMENTS: The following instruments shall be located on the student's instrument panel, subpanel, console, or as specified herein:

One combination air speed indicator and Machmeter
One altimeter
One attitude gyro
One rate-of-climb indicator
One turn and slip indicator
One radio magnetic course indicator
One course deviation indicator (ID-351)
One pilot's display (part of fire control system)
One fuel quantity indicator and selector switch
One clock
One cabin pressure altimeter
One single hydraulic pressure indicator and selector switch
One fuel flow indicator
One tachometer
One turbine outlet temperature indicator
One alternating current voltmeter and selector switch
Three landing gear position indicators
One engine pressure ratio gage
One outside air temperature indicator
One magnetic stand-by compass (in canopy)
One afterburner position indicator

3.14.1.2 INSTRUCTOR INSTRUMENTS: The following instruments shall be located on the instructor's instrument panel:

One course deviation indicator (ID-48)
One pilot's display (part of fire control system)
One radio magnetic course indicator
One combination air speed indicator and machmeter
One altimeter
One attitude gyro
One rate-of-climb indicator
One turn and slip indicator

9.8 '54

CONFIDENTIAL

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3.14.2 NAVIGATION EQUIPMENT: See Section 3.17.

3.14.3 INSTALLATION: Instruments shall be installed in accordance with the HIAD, and other applicable specifications, except as noted in Appendix II. The pitot tube shall be installed in accordance with MIL-I-5072 and shall be located on a boom extending forward from the tip of the radome. Provisions shall be made for operation of the integral electric heater.

(118) (119)
(120) (123)
(168)
thru
(171)
(218)
(247)
(248)

9.8 '54

CONFIDENTIAL

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3.15 HYDRAULIC AND PNEUMATIC SYSTEMS:

3.15.1 HYDRAULIC SYSTEM:

3.15.1.1 (193) thru (202) (206) (214) DESCRIPTION AND COMPONENTS: The hydraulic systems shall be in accordance with Specification No. MIL-H-5440, except as noted in Appendix II. The hydraulic configuration shall consist of two separate continuously-operating, closed center systems. The systems shall be of equivalent capacity, each developing approximately one-half the full hinge moment. Each system shall be powered by an engine-driven 3000-psi, variable volume pump. One system will be considered as the primary system, to be used for controls only. The other system will be known as the secondary system, to be used for controls plus utility items such as landing gear, speed brakes, emergency A.C. generator, and nose wheel steering. Dual-tandem cylinders shall be provided on the elevons. A single tandem cylinder shall be provided on the rudder. Dual control valves shall be provided for each surface. The primary and secondary systems need not and shall not be interconnected, except mechanically, at the surface control valve and actuating cylinders. Either system shall be capable of flying the airplane equally well under reduced maneuverability in the event of failure of the other. All utility items, when not in use, shall be shut off from the secondary system. If the primary system is inoperative, the landing gear may be lowered by an emergency method, thus relieving possibility of failure of the secondary system at landing. To provide for failure of the power plant, which is the only source of continuous power for the control systems, an emergency hydraulic pump driven by a ram air turbine will supply power to the primary hydraulic system for controls. The ram air turbine will be used to provide hydraulic power to permit landing the airplane and at flight speeds where windmilling engines will not provide sufficient power to the engine driven hydraulic pumps. Hydraulic pumps shall be approved by Wright Air Development Center.

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9.8 '54

CONFIDENTIAL

3.15.1.2 SUMMARY OF ACTUATED ITEMS: The hydraulic system shall be used to actuate the following items:

Surface control system
Landing gear extension and retraction and doors
Speed brakes
Nose wheel steering
Emergency A.C. generator.

3.15.2 PNEUMATIC SYSTEMS:

(54) (207) thru (213)

3.15.2.1 LOW PRESSURE PNEUMATIC SYSTEM: A low pressure pneumatic system shall be installed for air conditioning, as described under paragraph 3.20.

3.15.2.1.1 SUMMARY OF FUNCTIONS: The low pressure pneumatic system shall provide:

Hydraulic Reservoir Pressurization
Cabin pressurization and air conditioning
Fuel tank pressurization
Air intake duct anti-icing
Canopy seal pressurization
Anti "G" suit pressurization
Windshield spot rain clearing
Glycol tank pressurization
Elevon feel intelligence system pressure.

3.15.2.2 HIGH PRESSURE PNEUMATIC SYSTEM: A high pressure pneumatic system shall be provided in accordance with Specification No. MIL-P-5518, except as noted in Appendix II.

3.15.2.2.1 DESCRIPTION AND COMPONENTS:

The high pressure pneumatic system obtains its energy from air stored in the air flasks which are charged to 3000 psi from a ground source. A pressure regulator reduces and regulates the air pressure for use in the armament and rudder feel systems. The

CONFIDENTIAL

9.8 '54

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3.15.2.2.1 DESCRIPTION AND COMPONENTS: (Cont)

normal capacity of the high pressure pneumatic system shall be capable of three cycles of armament door operation and one cycle of all armament displacement racks. For the alternate loading of the armament racks the capacity of the high pressure pneumatic system shall be capable of four cycles of armament door operation and two cycles of all armament displacement racks. Sufficient pressure and volume shall remain to operate emergency lowering of the landing gear, extension of the ram air turbine, operation of the drogue chute and wheel brakes.

3.15.2.2.1.1 SUMMARY OF ACTUATED ITEMS: The high pressure pneumatic system shall be used to actuate the following items:

Emergency landing gear extension
Armament displacement gear
Main landing gear brakes
Armament bay doors
Ram air turbine unlatch and extension
Rudder feel system cylinder
Drogue chute release

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3.16 ELECTRICAL:

3.16.1 DESCRIPTION: The electrical system shall consist of a 28-volt direct current power supply and a 115/200 volt, 400 cycle three-phase alternating current power supply. Provisions shall be made for emergency operation of essential A.C. and D.C. loads. Emergency operation of essential A.C. loads shall be from a hydraulic driven A.C. generator.

3.16.2 ELECTRICAL POWER SUPPLY:

3.16.2.1 (258) (262) thru (267) DIRECT CURRENT: Direct current shall be supplied by a 200 ampere, 30-volt air cooled generator which shall be driven from an accessory gear pad on the input side of a constant speed drive. The input gear box shall be driven from the engine through a suitable gear and drive shaft arrangement. The generator and control panel shall be in accordance with Contractor Specification 8-06370. The distribution system shall include an "essential" and a "non-essential" bus with provisions for automatically disconnecting the "non-essential" bus in event of generator failure. A 24-volt, 24 ampere-hour battery shall be installed and connected to the essential bus. Means shall be made to inspect battery fluid level and to check specific gravity of the fluid. Provision for voltage adjustment in flight is not required. Provision shall be made to adjust the voltage safely while the aircraft is on the ground.

3.16.2.2 ALTERNATING CURRENT: The alternating current power shall be supplied by a 30 KVA, 120/208 volt, three-phase, air cooled A.C. generator driven by a hydro-mechanical constant speed drive. The constant speed drive shall be driven from the engine through a suitable gear and drive shaft arrangement as specified in paragraph 3.12.4, and shall be controlled to maintain the frequency of the A.C. generator to within ±1.0 percent. The generator, regulator and control panel shall be in accordance with Contractors Specification 8-06371.

15 OCT 1954

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3.16.3 ELECTRICAL POWER CONVERSION:

3.16.3.1 INSTRUMENT POWER: Instrument power shall be supplied by a 200/115-volts, three-phase transformer. This power shall be used to operate the electrically-driven alternating current gyro instruments. A 115/26V single-phase transformer shall be installed for autosyn instruments and J-2 compass system. These transformers shall receive power from the airplane's alternating current bus.

3.16.3.2 EMERGENCY POWER:

3.16.3.2.1 DIRECT CURRENT: In the event of failure of the airplane D.C. generator, power shall be supplied for the essential bus only, from the battery.

3.16.3.2.2 ALTERNATING CURRENT: Emergency power, in the event of failure of the main A.C. generator, shall be supplied from a 1-KVA, three-phase, 120/208-volt A.C. generator driven by a hydraulic motor.

3.16.4 (53)(250)(252)(253)(259)(273) EQUIPMENT INSTALLATION: Electrical equipment shall be installed in accordance with Specification MIL-E-7563 and MIL-E-7080 as applicable, except as noted in Appendix II. The battery shall be so installed as to permit ease of replacement and shall be vented as required. Equipment shall be installed to operate in ambient temperatures within the limits of applicable specifications, except that higher temperatures during periods of time not to exceed five minutes will be permissible.

3.16.5 (53)(172) thru (178) (180)(181)(182)(184) thru (197)(251) WIRING: Wiring shall be installed in accordance with Specification No. MIL-W-5088, except as specified in Appendix II.

3.16.6 (53) BONDING: The airplane and equipment shall be bonded as required by Specification No. MIL-B-5087. Shielding shall conform to Specification No. MIL-W-5088.

15 OCT 1954

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CONFIDENTIAL

3.16.7 (128) (254) (255) (269) CONTROLS: Switches, circuit breakers, rheostats and resistors shall be provided as required and shall be in accordance with applicable specifications, or as otherwise approved by the WADC.

3.16.7.1 (272) POWER CONTROL: The electrical power control shall consist of a battery switch, a D.C. generator control switch an A.C. generator control switch, and an emergency electrical power cut-off switch. Failure of either generator shall be indicated by one of two warning lights which are on the "Master Warning Light" system panel, as outlined in paragraph 3.16.11.3. Disconnection of non-essential buses in event of generator failure shall be automatic. Both generator control switches shall provide positions for "ON, "OFF, and "RESET." The emergency cut-off switch shall disconnect all power generation equipment (both A.C. and D.C.) and the battery from the buses.

3.16.8 LIGHTING:

(53)

3.16.8.1 GENERAL: Lighting shall be installed in accordance with Specification No. MIL-L-6503 (USAF). All lighting fixtures and accessory equipment shall be in accordance with applicable specifications or as otherwise approved by the WADC.

3.16.8.2 ⑬ (137) (224a) (225) thru (230) (236) (238) (241) (276) INTERIOR: Instrument lighting shall be in accordance with Specification MIL-L-6423A, except as noted in Appendix II. Console panels shall be edge-lighted type in accordance with Specification No. MIL-P-7788, except as noted in Appendix II. Thunderstorm lighting, with off-on switch, shall be provided. All interior lighting except the flight instrument primary lighting shall be operated from the A.C. bus. All primary lighting shall be on the essential bus. Secondary and thunderstorm lights shall be on the non-essential bus.
One type C-4A utility light shall be installed accessible to both the student and instructor.

15 OCT 1954

5 JAN 1955

CONFIDENTIAL

3.16.8.3 (231) thru (234) (243) thru (246) EXTERIOR: Exterior lighting shall be in accordance with Specification No. MIL-L-6503 (USAF) and the applicable portions of Specification MIL-L-6730, except as noted in Appendix II. A taxi light shall be provided on nose landing gear door. Landing lights shall be installed on both main landing gear wing fairing doors and shall provide the required illumination. The wing tip, tail and fuselage lights shall be of a special design and shall be subject to approval by WADC, The position lights shall be operated from the essential A.C. bus through transformers.

3.16.9 (268) IGNITION AND STARTING CONTROL SYSTEM: The ignition and starting control system shall be designed to the requirements of the manufacturer of the specified engine. Controls shall be located for ease of operation by the student only and shall be subject to WADC approval.

3.16.10 RECEPTACLES:

3.16.10.1 (261) EXTERNAL POWER: Both direct and alternating current external power receptacles shall be provided for ground operation. The receptacles shall be located as approved by the Mock-Up Board and shall be accessible from the ground. The receptacles shall energize both the essential and non-essential buses when the respective external power plugs are connected. The D.C. and A.C. power receptacles shall conform to AN2552-3A and AN3114-1B respectively.

3.16.10.2 (179) (183) ELECTRICAL CONNECTORS: Electrical connectors shall conform to Specification No. MIL-C-5015, except as noted in Appendix II, and except that where special connectors are required, they shall be subject to WADC approval.

3.16.10.3 (260) FUEL NOZZLE GROUNDING JACK: A fuel nozzle grounding jack shall be provided adjacent to the fuel tank filler connection and shall be identified in accordance with Drawing No. AND 10439.

15 OCT 1954

CONFIDENTIAL

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3.16.10.4 **STATIC GROUND:** A static ground shall be provided on the landing gear in accordance with USAF Drawing No. 49B7572.

3.16.11 **INDICATORS:**

3.16.11.1 **ALARMS:** Landing gear warning horn not required.

(270)

3.16.11.2 **SIGNAL ASSEMBLIES:** Three landing gear signal assemblies, Specification No. MIL-I-6839, shall be provided on the student's instrument panel to indicate the position of the landing gear units. A cabin altitude warning is not required.

(18) (122)

3.16.11.3 **WARNING LIGHTS:** Warning lights for the master warning system, hydraulic system (pressure low), and fire and overheat detector system shall be provided on the student's instrument panel. A fire warning indicator light shall also be provided on the instructor's instrument panel. Adjacent to the canopy latch handle shall be located the canopy "UNLOCKED" warning light. In the translucent handle of the landing gear control levers shall be located the landing gear "UNSAFE" warning light. The "HYDRAULIC PRESSURE" warning light shall flash for indication of failure of one system and burn continuously for indication of failure of both hydraulic systems. A switch shall be provided adjacent to the hydraulic warning light to permit the student to extinguish the flashing light (after one system failure) and re-set the warning system for indication of failure of the other hydraulic system. In addition a sub-panel shall be provided on which all non-critical warnings will be grouped. Each non-critical warning signal shall energize a pair of bulbs placed behind a translucent panel. Illumination of the bulbs shall permit the lettering on the panel to become readable. Adjacent to this panel the "Master Warning Light" re-set switch shall be provided. The master warning system shall operate as follows: when warning occurs, other than the four listed above, both the master warning light and the appropriate lights on the sub-panel shall illuminate. The student may operate the "Master Warning Light" reset switch, thereby extinguishing and resetting the light. (Reset operation need not be accomplished prior to additional failures indicating

(239) (240) (275)

15 OCT 1954

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3.16.11.3 WARNING LIGHTS (Cont)

on the sub-panel). The system shall then be ready for the next warning. The individual warning lights on this system shall operate independent of the master warning system. A switch shall be provided to test all the lights on the system. The warnings to be included shall be as approved by the Mock-Up Board. The warning lights on the sub-panel shall be of a design approved by WADC.

3.16.11.4 (256) (274) (275) METERS: An alternating current voltmeter for use by the student shall be provided with a selector switch to check various alternating current voltages.

3.16.12 ELECTRIC DRIVES: Electric motors shall be in general accordance with Specification No. AN-M-40. Specifications shall be prepared for all electro-mechanical actuators used in the airplane. These specifications shall include applicable environmental test, test reports, design operating loads and design static loads. These specifications shall be submitted for WADC review.

3.16.13 (257) RELAYS: Relays shall be in accordance with applicable specifications and drawings, except that where special units are required they shall be subject to WADC approval. Relays shall be hermetically sealed where required due to danger of explosion or for operation at altitude.

3.16.14 BOOSTER COIL: Not applicable.

3.16.15 FILTERS: Filters shall be installed only where necessary to insure compliance with Specification No. MIL-I-6051. The type of filters used shall be as approved by WADC.

3.16.16 LOAD ANALYSIS: Electrical load analysis Specifications MIL-E-7016 and MIL-E-7017 shall form a part of this specification.

15 OCT 1954

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3.17 (176) (220) ELECTRONICS: Installation and provisions shall be made by the Contractor, to the extent specified in paragraph 3.17.1 for the installation of electronic equipment. Provisions shall be in general accordance with Specification No. MIL-I-8298.

3.17.1 EQUIPMENT: The following radio and radar equipment shall be installed by the Contractor. The equipment shall be bench, preflight, and flight tested in accordance with applicable specifications listed herein.

Description	Nomenclature	Installation Specification	Performance Specification
UHF Command	AN/ARC-34	WCLC-52-92	MIL-R-8272(USAF)
Interphone	AN/AIC-10	WCES-52-38	MIL-I-6999(USAF)
Marker Beacon Receiver	AN/ARN-12	---	MIL-M-5345(USAF)
Glide Slope Receiver	AN/ARN-18	X-7296	MIL-R-7263
VHF Navigation Receiver	AN/ARN-14	X-7289A	MIL-R-6334(USAF)
Ground Air IFF	AN/APX-6A	MIL-R-9298	MIL-R-6335(USAF)
*Fire Control System	MG-9(Hughes)	(See paragraph 3.17.4.7.1)	

5 JAN 1955

CONFIDENTIAL

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* See Paragraph 3.17.4.7.1 for A/C using this System.

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3.17.1 EQUIPMENT (Cont)

Complete provisions for the following equipment shall be made:

Description	Nomenclature	Installation Specification	Performance Specification
Ground Air IFF	AN/APX-25A (Manual Control) (Alternate equipment installation of AN/APX-6A)	MIL-T-9289	

The following equipment shall have space and weight provisions:

Description	Nomenclature	Installation Specification	Performance Specification
OMNI - DME	AN/ARN-21	WCES-52-50	---

The following equipment shall have space provisions:

Description	Nomenclature	Installation Specification	Performance Specification
UHF Direction Finder Group	AN/ARA-25	WCES-52-53	---

3.17.1.1 (124) (138) CONTROL PANELS: The following radio and radar control panels shall be installed:

Nomenclature	Description
C-1057/ARC-34	UHF Command Control Panel
C-996/A	VHF Navigation Control Panel
MG-9	Controls (see paragraph 3.17.4.7.1)
C-1158/APX	IFF Transponder Control
C-824/AIC-10	Interphone Control Panel (2)

9.8 '54 15 OCT 1954

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3.17.1.1 CONTROL PANELS (Cont)

Complete provisions for the following radio control panels shall be made:

Nomenclature	Description
C-1128/APX-25	IFF Coder Group Control

Space and weight provisions for the following radio controls shall be made:

C-866/ARN-21	OMNI-DME Control

3.17.1.2 ANTENNAS: All antennas except the GFAE fire control system radar antenna shall be Contractor furnished and installed in accordance with applicable military specifications, except as noted in Appendix II. Antennas shall be provided for the required systems as listed in paragraph 3.17.1.

3.17.1.3 INTERFERENCE: Radio interference tests shall be conducted and necessary suppression accomplished in accordance with Specification No. MIL-I-6051A.

3.17.1.4 WIRING: Wiring shall be installed in accordance with Specification No. MIL-W-5088 except as otherwise stated herein and in Appendix II. All wiring shall be identified and coded in accordance with applicable USAF wiring diagrams. Wiring diagrams shall be submitted for approval.

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3.17.1.5 COOLING: The Contractor shall provide adequate cooling for radio, radar, and fire control components. Such cooling shall be subject to the approval of the WADC.

3.17.2 COMMUNICATIONS EQUIPMENT:

3.17.2.1 COMMAND SET - AN/ARC-34: One UHF communications unit shall be installed in the intermediate electronics compartment. This equipment is used for aircraft to aircraft or aircraft to ground communications. The control shall be installed on the left hand side console.

3.17.2.1.1 The UHF antenna, part of the fin-type antenna assembly, shall be located on the vertical fin, and shall be designed and installed by the Contractor to meet, as a minimum, the performance requirements of Specification No. MIL-A-6224A (USAF) and the requirements of paragraph 3.17.1.2, except as noted in Appendix II.

(224)

3.17.2.2 LIAISON SET: Not applicable.

3.17.2.3 INTERPHONE: The necessary circuits and components of intercommunication set AN/AIC-10 shall be installed to provide for the use by both the student and instructor of microphone M-32/AIC (oxygen mask) and head set H-75/AIC (helmet). The installation shall provide a selective "Hot Mike" interphone system for the student and instructor. A control panel for the student shall be located on the center console. A separate control panel for the instructor shall be located on the right hand console. Provisions shall be made for ground interphone communications between the cockpit and the nose wheel area. The dynamotor shall be installed in the intermediate electronics compartment.

3.17.2.4 MICROPHONE AND HEADSETS: Provisions for microphones and headsets shall be made in accordance with paragraph 3.17.2.3. Four microphone switches, AF Specification No. 32549, shall be installed; one on each throttle control and one on each control stick grip.

3.17.2.5 FILTER EQUIPMENT: Not applicable.

3.17.2.6 RECORDING EQUIPMENT: Not applicable.

2.17.3 NAVIGATION EQUIPMENT:

3.17.3.1 RADIO COMPASS: [illegible]

CONFIDENTIAL

15 OCT 1954

9.8 '54

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3.17.3.2 MARKER BEACON EQUIPMENT - AN/ARN-12: The receiver shall be located in the intermediate electronics compartment. This equipment is used for receiving the 75 megacycle marker transmission. An indicator light, part of the VHF navigation course indicator, is mounted on each instrument panel.

3.17.3.2.1 The antenna for the marker beacon receiver shall be located in the aft section of the left hand center missile bay door. It shall be installed to meet the performance requirements of Specification No. MIL-A-5999 (USAF) and paragraph 3.17.1.2.

3.17.3.3 INSTRUMENT APPROACH EQUIPMENT:

3.17.3.3.1 GLIDE PATH RECEIVER AN/ARN-18: The receiver shall be installed in the intermediate electronics compartment. Choice of the appropriate glide path and localizer channels shall be afforded from the navigation receiver control unit located on the center console. Deviation indication shall be provided by a VHF navigation course indicator located on each instrument panel.

3.17.3.3.1.1 The glide path antenna shall be installed in the nose of the fuselage enclosed by the radome and shall meet the performance requirements of Specification No. MIL-A-6325 (USAF).

3.17.3.3.2 LOCALIZER RECEIVER: See paragraph 3.17.3.7.

3.17.3.4 ALTIMETER - RADIO: Not applicable.

3.17.3.5 RADIO RANGE RECEIVER: Not applicable.

3.17.3.6 HOMING ADAPTER AN/ARA-25: Space provisions shall be made for components of the ARA-25 Direction Finder Group.

3.17.3.6.1 Space provisions for the direction finder antenna shall be made on the under side of the fuselage forward of the nose landing gear.

15 OCT 1954

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3.17.3.7 VHF NAVIGATION RECEIVER - AN/ARN-14: The receiver and power unit shall be installed in the intermediate electronics compartment. The receiver provides navigational facilities in the omni range and localizer frequencies. The control shall be installed in the center console. One course deviation indicator and one radio magnetic course indicator shall be installed on each instrument panel. One radio control indicator shall be installed in the intermediate electronics compartment.

3.17.3.7.1 A compass signal power amplifier shall be installed in the intermediate electronics compartment.

3.17.3.7.2 The VHF Navigation antenna, part of the fin tip antenna assembly, shall be located on the vertical fin and shall meet the performance requirements of Specification No. MIL-A-6300(USAF).

3.17.3.8 OMNI - DME EQUIPMENT - AN/ARN-21: Space and weight provisions shall be made for the omni DME equipment in the intermediate electronics compartment. Space and weight provisions for the control and indicator shall be provided on the center console.

3.17.3.8.1 The L-Band antenna, installed on the top centerline of the fuselage, shall be used with the AN/APX-6A equipment prior to installation of the AN/ARN-21 equipment.

(242)

3.17.3.9 ARBITRARY COURSE COMPUTER: Not applicable.

3.17.4 RADAR:

3.17.4.1 SEARCH EQUIPMENT: Not applicable.

3.17.4.2 LORAN EQUIPMENT: Not applicable.

3.17.4.3 AUTOMATIC GROUND POSITION INDICATING EQUIPMENT: Not applicable.

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3.17.4.4 IDENTIFICATION EQUIPMENT:

3.17.4.4.1 IDENTIFICATION SET - AN/APX-6A (Ground-to-Air IFF): The receiver-transmitter unit shall be installed in the intermediate electronics compartment. The control shall be located on the center console.

3.17.4.4.1.1 L-BAND ANTENNAS: One antenna located on the top centerline of the fuselage aft of the canopy and one antenna located on the bottom centerline of the fuselage forward of the nose wheel well shall be installed by the Contractor to meet the performance requirements of Specification No. MIL-A-6543 (USAF) and paragraph 3.17.1.2, except as noted in Appendix II. Until the AN/ARN-21 equipment is installed, AN/APX-6A system shall also utilize the L-Band antenna located on the top centerline of the airplane. (See paragraph 3.17.3.8.1).

3.17.4.4.1.2 As an alternate installation for AN/APX-6A, complete provisions for AN/APX-25 ground-to-air IFF shall be installed. Complete provisions for the controls shall be made in the center console. Complete provisions for the keyer shall be made. The L-Band antennas described in paragraph 3.17.4.4.1.1 shall be utilized.

3.17.4.4.2 IDENTIFICATION SET (Air-to-Air IFF) - AN/APX-27 (Part of the Fire Control System): The transmitter, amplifier, duplexer and coupling component provisions shall be installed in the lower section of the vertical fin. The receiver and synchronizer provisions shall be located in the aft accessory compartment. The control provisions shall be installed on the center console.

3.17.4.4.2.1 The IFF antenna shall be located in the fin tip and shall be an integral part thereof. The antenna shall be designed by Hughes Aircraft Company and shall be fabricated and installed by the Contractor in accordance with the following Hughes Aircraft Company drawings:

A464A-4315, A464A-4315-1, A464A-4315-3, A464A-4315-4 and A464A-4315-7.

15 OCT 1954

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CONFIDENTIAL

3.17.4.5 INTERROGATION EQUIPMENT:

3.17.4.5.1 AIR-TO-AIR INTERROGATOR-RESPONSER - AN/APX-26 (Part of the Fire Control System): The equipment provisions shall be installed in the forward electronics compartment (nose section) in conjunction with the radar fire control system. The provisions for the control shall be located in the cockpit as part of each radar antenna control.

3.17.4.6 RADAR BEACON: Not applicable.

3.17.4.7 FIRE CONTROL SYSTEM: MG-9 Hughes Aircraft Company.

3.17.4.7.1 Complete provisions for the MG-9 Fire Control System shall be made in all aircraft. The MG-9 Fire Control System components shall be installed in aircraft Serial No. AF54-1353 and on, except that complete provisions only shall be made in all aircraft for the following sub-systems.

AFCS	Automatic Flight Control System
AN/APX-26	Interrogator-Responser, Air-to-Air IFF (Reference paragraph 3.17.4.5.1).
AN/APX-27	Transponder, Air-to-Air IFF (Reference paragraph 3.17.4.4.2)
- - -	Data Link
AILS Coupler	Automatic Instrument Landing System
Optical Sights	Deflection Type

3.17.4.7.2 In general, the nose section of the aircraft shall consist of a radome to house the radar antenna and an equipment compartment for the radar and computer sub-systems of the MG-9 system.

3.17.4.7.3 Cockpit controls and optical sights shall be arranged as specified in paragraph 3.7.1.3.1. A transfer switch shall be installed on the instructor's instrument panel to permit selective use of the MG-9 antenna hand control by either the student or instructor.

3.17.4.7.4 In general, the missile auxiliaries shall be located adjacent to the missile bays.

3.17.4.7.5 Provisions for the automatic flight control and AILS components of the MG-9 system shall be located in the intermediate electronics compartment. Provisions for the AFCS controls shall be in the center console.

CONFIDENTIAL

5 JAN 1955

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3.17.5 ELECTRONIC COUNTERMEASURE: Not applicable.

3.17.6 ELECTRONIC GUIDANCE SYSTEM:

3.17.6.1 GUIDE LINKS AND SYSTEMS: Provisions shall be made for data link equipment as part of the fire control system. The data receiver and converter-duplexer provisions shall be located in the intermediate and electronics compartment. The controls provisions shall be located in the center console.

3.17.6.2 A data link flush UHF antenna shall be installed on the door of the intermediate electronics compartment and shall meet, as a minimum, the performance requirements of Specification No. MIL-A-6224A (USAF) and the requirements of paragraph 3.17.1.2, except as noted in Appendix II.

3.17.7 STATIC DISCHARGERS: Not applicable.

3.17.8 EMERGENCY RESCUE TRANSMITTER: Not applicable.

3.17.9 RADOME: A quickly detachable radome shall be provided in the nose of the fuselage to accommodate the fire control system radar antenna. The radome shall be de-iced as specified in paragraph 3.20.2.1. The radome shall incorporate provisions for supporting a nose instrumentation boom as specified in paragraph 3.14.3.

3.17.10 GROUND TEST EQUIPMENT OUTLET: One receptacle, Type AN-3102A-18-9S, shall be installed which will accept multiple test equipment plug arrangements, provided by an available AF type service cord. The receptacle shall be mounted in the nose wheel well.

15 OCT 1954

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3.18 ARMAMENT:

(125)

3.18.1 DESCRIPTION: The armament installation shall consist of the specified aircraft rockets and guided missiles and related equipment.

3.18.2 FIXED GUNS: Not required.

3.18.3 ROCKETS AND MISSILES:

3.18.3.1 DESCRIPTION: The armament installation shall consist of GAR-1 and/or GAR-1B missiles and 2.75 inch rockets stored within the bays in the fuselage. Space provisions shall be provided for GAR-1A as defined by Hughes Drawing 142346, dated 2-3-54. The missile bays shall provide for alternate loading arrangements as specified in Section 3.2.13.1. The rockets and missiles shall be fired automatically by the fire control system. Manual firing of the rockets may be accomplished with the aid of the optical sights.

3.18.3.2 ROCKET LAUNCHER: The rocket launchers shall be an integral part of the missile bay doors which shall close flush with the fuselage contour when the launcher is in the retracted position. Means shall be provided for placing the rockets in firing position and for retracting the launcher to the closed position. A rocket firing electrical interlock shall be provided as a part of the rocket launcher to permit rocket firing only when the launcher is in the extended position. An additional rocket firing arrangement shall consist of six pods carried on the missile displacement gear described in paragraphs 3.18.3.3 and 3.2.13.1.1.

3.18.3.3 MISSILE LAUNCHER: Means shall be provided for carrying six missiles within the fuselage. Actuators shall be provided to extend the missiles prior to launching and for retracting the launcher after launching. The missile bay doors shall be provided with a locking arrangement to lock the doors in the closed position. Means shall be provided to hold the doors open on the ground. With the doors open and gear extended it shall be possible to load the missiles onto the launchers.

15 OCT 1954

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3.18.3.4 ALIGNMENT: The missiles shall be so aligned that, in the firing position, their axes will be fixed approximately three degrees down at the front with respect to the chord plane. The rockets shall be aligned approximately two degrees down to the chord plane in the firing position.

3.18.3.5 ARMAMENT CONTROLS:

3.18.3.5.1 The complete firing system shall be a part of the Fire Control System, except for the armament control panel, rocket and missile firing intervalometer and related circuitry.

3.18.3.5.1.1 Manually-operated momentary switches shall be provided in the nose wheel well for opening and closing the armament doors, and to raise and lower the displacing gear for loading.

3.18.3.5.2 It shall be possible to check the continuity of the rocket and missile firing circuits on the ground before aramament installation, with the aid of ground test equipment.

3.18.3.5.3 An interlock switch shall be provided to prevent inadvertent firing of the missiles or rockets when the landing gear is in the extended position.

3.18.3.5.4 OPTICAL SIGHT: An optical sight (fixed type) for each the student and instructor shall be installed in the cockpit as components of the fire control system.

3.18.3.6 EXTENSION AND RETRACTION TIME: The extension time and the retraction time for the armament doors shall each be approximately 1.0 seconds. The extension time for each launcher, with or without the missile, shall be approximately 0.9 seconds. The retraction time for each launcher, with or without the missile, shall be approximately 0.9 seconds. These times shall not be exceeded at any flight speed to limit speed (V_L) and normal load factor (N_Z) of plus or minus 1g from level flight (i.e., 0 to plus 2g). Positive extension and retraction shall be available at all speeds to V_L with the design or alternate weight configurations for a flight acceleration of ± 2g from level flight (i.e., + 3g and -1g).

15 OCT 1954

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3.18.4 **FLEXIBLE GUNS:** Provisions for flexible guns are not required.

3.18.5 **STORES:** Provisions for external armament stores are not required.

3.18.6 **PASSIVE DEFENSE:** Not required.

(126)

3.18.7 **BORE SIGHTING:** Bore sighting provisions shall be provided for the fire control system.

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3.19 FURNISHINGS AND EQUIPMENT:

3.19.1 ACCOMMODATIONS FOR PERSONNEL:

(130)

3.19.1.1 ⑩ (127) Ejection seats conforming to Contractors Specification No. 8-04322, shall be submitted to WADC for approval, and in general accordance with Specification MIL-S-9479, shall be installed for the pilots. The seats shall include provisions for attachment and use of an automatic opening lap type safety belt and a shoulder harness. The seats shall accommodate pilots wearing the emergency rescue equipment specified in paragraph 3.19.6.

3.19.1.2 (278) (279) Two pressure regulating valve assemblies, ejection, Type M-8 for anti-"G" suit, shall be installed in accordance with Specification No. MIL-I-7890, except as noted in Appendix II.

3.19.2 MISCELLANEOUS EQUIPMENT:

(129)

3.19.2.1 (136) (219) (275a) (218) Instrument panels shall be provided forward of the pilots for the flight and engine instruments specified in paragraph 3.14.1. The instrument panels shall be in accordance with Specification No. MIL-I-5997, except for deviations noted in Appendix II.

3.19.2.2 (131) (291) A combination flight report holder, map and data case shall be provided.

3.19.2.3 (161) (288) An airplane check list holder shall be provided. The check list shall conform to Specification No. 40149.

3.19.2.4 (60) A means for maintaining forward vision during rain conditions through the windshield curved panels on both sides of the pilots' enclosure shall be provided and shall be capable of operating at speeds corresponding to take-off, approach and landing.

15 OCT 1954

5 JAN 1955

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3.19.2.5 Provisions for food and drinking water are not required.

3.19.2.6 Provisions for pyrotechnics are not required.

3.19.3 FURNISHINGS:

3.19.3.1 ⑤ Thermal and acoustical insulating material shall not be provided.

3.19.4 (59) EMERGENCY EQUIPMENT: A light shall be provided on each of the student's and instructor's instrument panels which indicates fire in the engine accessory compartment and overheat in the engine after burner compartment. This light shall flash for indication of overheat and burn steady for indication of fire. Fixed fire extinguishers are not required. Portable and hand-type extinguishers are not required.

3.19.5 OXYGEN EQUIPMENT: A high-pressure oxygen system shall be provided consisting of the equipment specified in Appendix I, including the necessary tubing, fittings, brackets, etc. The oxygen bottle shall be installed perpendicular to line of flight and shall be located in the cockpit just forward of station 217 bulkhead on the shelf between fuselage longerons. The filler valve shall be located in the same place and shall be accessible from the left hand side when the canopy is open.

3.19.6 EMERGENCY RESCUE EQUIPMENT: The emergency rescue equipment for the pilots shall consist of seat-type survival kits and back-type parachutes having dimensions of 15 x 25 x 5 inches.

3.19.7 (241) SPARE BULBS: Spare light bulb stowage shall be installed in locations readily accessible to the pilots.

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3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT:

3.20.1 ⑥② thru ⑦⓪ (292)

AIR CONDITIONING: Air for pressurizing and air conditioning the cockpit is obtained from engine compressor bleed. This air passes through an "expansion turbine" type refrigeration package consisting of a ram air cooled heat exchanger (first stage) and an expansion turbine (second stage).

Control of cabin air pressure is obtained by the use of an automatic cabin pressure regulator located inside the cockpit.

Control of cabin air temperature is obtained through the use of a cabin temperature control device which controls butterfly position of a valve which by-passes bleed air around the refrigeration package.

Control of cabin air by the student is as follows:

A three position switch in the cockpit allows selection of:

(a) Cabin air "PRESSURE"
(b) Cabin air "OFF"
(c) Cabin air "RAM"

On emergencies, the student may shut-off all air to the cockpit and maintain pressurization for a short period, or he may select ram air into the cockpit for ventilation purposes.

3.20.1.1 IN-FLIGHT AIR CONDITIONING:

3.20.1.1.1 (61) (66)

OCCUPIED COMPARTMENTS: Air for pressurizing, heating, cooling and ventilating the cabin shall be as specified in paragraph 3.20.1. The operating pressure differential shall not exceed 5 psi. An altitude versus pressure schedule is shown on Figure 5, page 69.

9.8 '54

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3.20.1.1.2 OTHER COMPONENTS:

3.20.1.1.2.1 ROCKET AND MISSILE BAY: Air discharging from intermediate electronics compartment will enter missile bay. Temperature sensitive portions of the missiles will be maintained between 0° and 130° F.

3.20.1.1.2.2 ELECTRONIC EQUIPMENT COMPARTMENTS: Ram cooling air shall be supplied to the electronic equipment compartments as necessary to insure satisfactory operation of the equipment.

3.20.1.1.2.3 MISCELLANEOUS COMPARTMENTS: Cooling air shall be provided by means of ram air or cockpit discharge air for the following compartments: Forward electronics compartment, nose wheel well, intermediate electronics compartment.

3.20.1.2 GROUND AIR CONDITIONING:

(30) (34)

3.20.1.2.1 OCCUPIED COMPARTMENTS: On the ground, with the canopy closed, the pilots compartment shall be conditioned by means of air bled from the compressor section when the engine is in operation. During standby (engine not running) conditioned air shall be supplied by an auxiliary source (ground support equipment) through an external flexible duct into the cockpit with the canopy partially open.

3.20.1.2.2 OTHER COMPARTMENTS:

3.20.1.2.2.1 ROCKET AND MISSILE BAYS: Conditioned air to the rocket and missile bay is not provided. Temperature sensitive portions of the missiles will be maintained between 0° and 130°F. by ground support equipment.

3.20.1.2.2.2 ELECTRONIC EQUIPMENT COMPARTMENTS: On the ground the electronic equipment located in the forward and intermediate compartments shall be cooled as necessary to insure satisfactory operation of the equipment using the same air source as specified in paragraph 3.20.1.2.1 when the engine is in operation, or by use of an external air source supplied through a duct fitting located in the nose wheel well, when the engine is not in operation.

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3.20.2 ANTI-ICING

3.20.2.1 (162) thru (167) **ANTI-ICING OF NONTRANSPARENT AREAS:** Space and structural provision shall be installed in the wing, tail and fuselage for "non-evaporative, running-wet" type anti-icing in the wing and fin leading edges. The engine air intake duct lips shall be anti-iced by means of engine bleed air. The specified engine includes built-in anti-icing protection. Engine icing detector system shall be provided. The radome shall be de-iced by freezing point suppressant liquid spray system. This de-icing liquid shall be a special load item. Anti-icing shall be in accordance with Specification No. 40395-C, except as noted in Appendix II.

3.20.2.2 (215) (216) (217) **ANTI-ICING, DEFROSTING AND DEFOGGING OF TRANSPARENT AREAS:** Those portions of the windshield through which visibility is required for landing and use of the optical sights shall have provisions for anti-icing. Inner surfaces of windshield shall be defrosted and defogged in accordance with Specification No. MIL-T-5842. Defogging and defrosting of the canopy will not be provided, as noted in Appendix II.

3.21 **PHOTOGRAPHIC:** Not required.

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CABIN PRESSURIZATION SCHEDULE

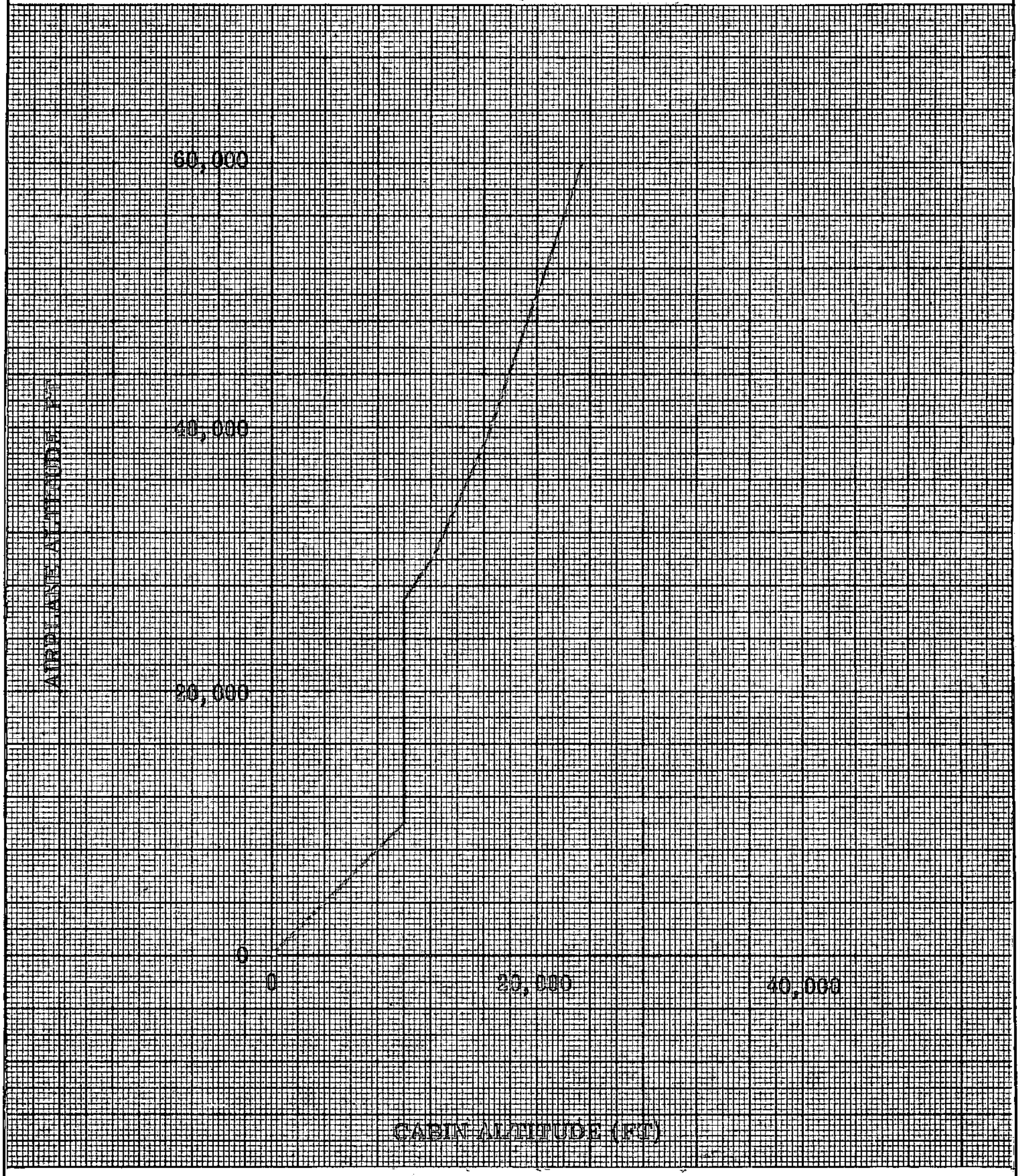

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Figure 5

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3.22 AUXILIARY GEAR: Auxiliary gear shall include provisions for towing, jacking, mooring, hoisting and leveling.

3.22.1 TOWING PROVISIONS:

3.22.1.1 MAIN LANDING GEAR: Tow lugs, or equivalent, with an inside diameter of not less than 2 inches shall be provided to permit attachment of a tow bar or cable for towing the airplane forward or backward.

3.22.1.2 NOSE LANDING GEAR: A hollow nose wheel axle with an inside diameter of 3/4 inch shall be provided to permit attachment of a tow bar for towing the airplane forward or pushing backward. An alternate arrangement in which an inside diameter of 3/4 inch extending one inch inboard from each outer face of the axle will be acceptable.

3.22.2 (143) (144) JACKING PROVISIONS: Provision shall be made to jack the airplane as required by the HIAD. The provisions shall be in accordance with Specification No. AN-J-5(2), except as specified in Appendix II. The fuselage jack pad shall be recessed and shall not include mooring provisions.

3.22.3 ㊲ MOORING PROVISIONS: Provision shall be made to moor the airplane in accordance with the requirements of the HIAD, except as specified in Appendix II. The fuselage mooring rings shall be separate from the fuselage jack point.

3.22.4 ㉝ HOISTING PROVISIONS: Provisions shall be made for hoisting the airplane and components in accordance with the requirements of Specification No. MIL-S-5944, except as noted in Appendix II.

3.22.5 ㊳ LEVELING: Leveling provisions consisting of two sets of leveling lugs, and a two jig point arrangement for measuring in accordance with Specification No. MIL-M-6756 shall be provided.

9.8 '54

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3.22.6 COVERS AND SHIELDS: Covers and/or shields for air scoop and exhaust openings, transparent glass and enclosures, wing, tail, and miscellaneous openings, conforming to Specifications No. MIL-C-5778, MIL-C-5462 and MIL-S-6451, as applicable, shall be furnished as specified in Appendix I-D of this specification.

3.22.7 SPECIAL GROUND SUPPORT EQUIPMENT: Special ground support equipment, when required, shall conform to Specification MIL-D-8512 and MIL-D-8513 and shall be furnished as determined through normal provisioning procedures.

3.22.7.1 The airplane and its components shall be designed to require a minimum quantity of support equipment for normal maintenance replacement of parts, or for servicing.

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4. SAMPLING, INSPECTION AND TEST PROCEDURES:

4.1 (147) The method of inspection and tests shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

5. PREPARATION FOR DELIVERY:

5.1 Preparation for delivery shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

9.8 '54

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6. NOTES:

6.1 EXPLANATORY INFORMATION: See applicable data, Appendix III.

6.2 ADDITIONAL INFORMATION: See applicable data, Appendix III.

6.3 DEFINITIONS: Where the phrases "complete provision for" "structural provision for", "space provision for" and "space and weight provisions" are used, the intent is defined as follows:

6.3.1 COMPLETE PROVISIONS FOR: "Complete provisions for" a specific item of equipment, or assembly or installation, shall mean that all supports, brackets, tubes and fittings, electrical wiring, hydraulic lines, etc., are to be installed and adequate weight and space allocated so that the equipment can be installed without alteration to the specified equipment or the airplane, and that no additional parts are required for installation, other than the item itself. Standard stock items such as nuts, bolts, cotter pins, etc., need not be furnished.

6.3.2 STRUCTURAL PROVISIONS FOR: "Structural provisions for" a specific installation shall mean that the primary structure will be structurally adequate for the installation, but that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be provided. Structural provisions also include weight of the equipment involved as an element of alternate weight.

6.3.3. SPACE PROVISIONS FOR: "Space provision for" a specific installation shall mean that space only shall be allocated for the installation, and that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be provided. "Space provision for" does not imply that adequate attaching structure is provided, unless otherwise stated in each instance.

6.3.4 SPACE AND WEIGHT PROVISIONS FOR: Same as "Space Provisions For" in paragraph 6.3.3 above, except the weight of the equipment as installed shall be included in "Design Gross Weight."

9.8 '54

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6.3.5 OTHER DEFINITIONS: Definitions of the HIAD, NACA technical Report No. 474, and Specification No. MIL-I-6252 (USAF) are considered applicable to the airplane described herein.

6.4 Approval by the Procuring Service of a system or component for the F-102A Aircraft shall also constitute approval for the TF-102A Aircraft provided the system and/or components are used in the same application.

6.5 ANTENNAS: Those antennas common with the F-102A Aircraft shall be installed on a TF-102A flight article and only evaluation type flight tests conducted to establish acceptability. Other Antennas shall be tested per applicable specifications.

8 SEP 1954 17 JAN 1955

CONFIDENTIAL

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

LANDING GEAR (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	1	Wheel Assy - Nose, 24 x 5.5 - Type VII, MIL-W-5013A, S47R459Q	41-1150	20.0
2	2	Wheel Assy - Main Landing, 30 x 8.8 EHP, Type VII, MIL-W-5013A, S52E1235B (Bendix 148050)	41-1675 or 41-1153	88.0
3	2	Brake Assy - Main Landing (for 30 x 8.8 wheel) Type VII, MIL-W-5013A, S52E1235 (B) (Bendix 148320)	41-1156	160.6
4	2	Casing - Main Wheel, 30 x 8.8 EHP, High Speed (18 ply rating), Type VII, MIL-C-5041, S52J1096E	41-1677	97.9
5	2	Tube - Main Landing, 30 x 8.8 (fabric base), Type VII, MIL-T-5014A, S52J1096	41-1678	15.3
6	1	Casing - 24 x 5.5 Extra High Pressure, High Speed, 12-Ply Rating, Type VII, MIL-C-5041, S48F84 Chg "L"	41-7831	20.6
7	1	Tube - 24 x 5.5 Extra High Pressure, Fabric Base, Type VII, MIL-T-5014B	41-7832	3.7

POWER PLANT (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	1	Engine - Turbo Jet, Including Flap Type After-Burner Nozzle, P & W J57-P-23 (as installed)	35-1608	5058.0
2	1	Starter - Pneumatic, Aircraft Engine, Type MB-3, MIL-S-5866A	42-9400	31.3
		(Pressure regulating and shut-off valve not installed on airplane)		
3	1	Constant Speed Accessory Drive Consisting of one each of the following:		
a		Gear Box Engine - Mounted Sundstrand #M-634800.	48-529	15.0
b		Transmission and Gear Box Sundstrand #M-634810.	48-530	90.0

CONFIDENTIAL

9.8 '54

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		POWER PLANT (Weight Empty) (Cont)		
3	1	Constant Speed Accessory Drive (Cont)		
c		Drive Shaft, Sundstrand #M-634828	48-528	3.0
d		Covered Drive Shaft, Sundstrand #634838	48-527	1.0
e		Negative "G" Valve, Sundstrand #M-636109	48-534	4.0
		INSTRUMENT (Weight Empty)		
1	2	Altimeter - Pressure, Sensitive, Type MB-2	60-606	2.6
2	1	Indicator - Cabin Air Pressure, Pressurized Aircraft, 1-7/8 in. Dial, Type MA-1, MIL-I-5099A (Aer)	60-603	0.4
3	1	Clock - 1-Hour Elapsed Time, 12-Hour Dial, Type A-13A, MIL-C-6499	60-1201	0.4
4	1	Remote Compass - Type J-2, Consisting of		
	1	Compensator - Transmitter, Slaved Gyro Magnetic Compass, 27635	60-1479	1.1
	1	Control - Directional, Electrically-driven Gyro, Type S-3A, MIL-C-6231A, AM #1	60-1480	7.0
	1	Transmitter - Remote Compass (unstabilized), Type C-2, 27635	60-1483	(incl. with 60-1479)
	1	Amplifier - Single Channel, Integral Slaved Gyro Magnetic Compass, Type A-2, MIL-A-6859	60-1702	6.6
	1	Amplifier - Two-Channel, Integral, Type B-7A, 21074-D	60-1705	5.0
5	1	Compass, Magnetic, 28V, Pilot Stand-by AN5766-4	60-1447	0.8
6	2	Indicator - Airspeed, Mach Number and Maximum Allowable Speed, Pitot Static, Type ME-2, Exhibit WCL-404, MIL-I-6269	60-4938	2.6

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9.8 '54

FORM 1812

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

INSTRUMENTS (Weight Empty)(Cont)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
7	2	Indicator, Turn and Slip, 4-min Turn, 28-volt D.C., Type MD-1A	60-5703	3.8
8	2	Indicator - Attitude, Type J-8, MIL-I-5133B	60-5933	5.6
9	2	Indicator - Rate-of-Climb, Type AN5825-7, MIL-I-7721	60-6901	2.6
10	1	Tube - Pitot Static, 24-volt, AN5816-2, MIL-T-5420A	60-9200	1.0
11	1	Indicator - Tachemeter, Electric, O -110% RPM, Single, MS28000-1, MIL-I-5573A	61-222	0.9
12	2	Transmitter-Hydraulic Pressure, Synchro, MS28005-5, 0-4000 psi, 320° Movement, MIL-T-7113	61-1455	2.3
13	1	Indicator - Hydraulic Pressure, Synchro, MS28010-5, Clamp-mounted, 2-in. size, 0-4000 psi, MIL-I-7084	61-1456	0.7
14	1	Transmitter - Rate-of-Flow, (Fuel), Style J-6, MIL-T-6598	61-2446	7.0
15	1	Indicator - Rate-of-Flow, (Fuel), Style A-19, MIL-I-6599	61-2447	0.5
16	1	Generator - Electric Tachometer, 2-Pole, Jet Engine, MIL-G-6027, AN5544-3	61-8710	1.9
17	1	Indicator - Turbine Outlet Temperature, Thermocouple, Single, 0-1000°C, MS28006-1, MIL-I-7076	61-8829	0.6

9.8 '54

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt (LB)
		ELECTRICAL (Weight Empty)		
1	1	Battery - Aircraft Storage, 24-volt, 24-amp-hr, Type AN3151-2	42-350	56.0
2	1	Generator - A.C., 30 KVA, 120/208-volt, 3-Phase (Convair Spec 8-06371	42-315	75.0
3	1	Panel - Control, A.C., 115/200-volt, (Convair Spec 8-06371)	42-746	9.0
4	1	Regulator - Voltage, A.C., 115/200-volt	42-301	13.0
5	1	Generator - D.C., 200-ampere, 30-volt (Convair Spec 8-06370	42-2028	48.0
6	1	Panel - Control, D.C. (Convair Spec 8-06370)	42-747	9.5
		ARMAMENT - ORDNANCE (Weight Empty)		
1	6	Initiator - With Cartridge, Type M-3	93-316	4.8
2	2	Exactor - Type M-1	93-317	0.1
3	2	Catapult - Aircraft, Personnel, With Cartridge, Type M-3	93-320	49.4
4	2	Initiator - Delay, with Cartridge, Lap Belt Release, Type M-4 (T-13)	93-726	2.0
5	1	Thruster - With Cartridge, Type M-3	93-742	1.0
6	1	Initiator - With Cartridge, Type M-5	93-318	0.8
		ARMAMENT - (Design Useful Load)		
1	6	Launchers - Missile (Part of fire control system).		150.0

5 JAN 1955

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		FURNISHINGS AND EQUIPMENT (Weight Empty)		
1	2	Belt - Aircraft Safety, Lap, Automatic Opening, Type MA-4	45-1717	8.0
2	2	Harness - Shoulder, Aircraft Safety, Adjustable, Type MB-3 (54D 19600)	45-2443	2.2
		ELECTRONICS (Weight Empty)		
		UHF Command Set AN/ARC - 34		
1	1	Receiver-Transmitter, RT-263/ARC-34	81-8188	47.2
2	1	Control Panel - C-1057/ARC-34	81-2253	2.9
		Intercommunication Set AN/AIC-10		
1	2	Interphone Control - C-824/AIC-10, MCREE-867A, 52D12809 and 2C684-824	81-2226	6.6
2	1	Dynamotor - DY-77/AIC-10, MCREE-867A, 52B12813, 3H-1535-77	81-2910	4.3
3	1	Relay RE-94/AIC-10	81-8750	1.9

15 OCT 1954

9.8 '54

CONFIDENTIAL

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		ELECTRONICS (Weight Empty)		
		Marker Beacon Receiving Set AN/ARN-12		
1	1	Radio Receiver, R-122A/ARN-12 or R-122/ARN-12, 7082A, 2C4180-122	81-8154	7.2
		Radio Receiving Set AN/ARN-18		
1	1	Radio Receiver - R-322/ARN-18, MIL-R-6201, 2C4180-322	81-8164	16.0
		Radio Receiving Set AN/ARN-14D		
1	1	Receiver - Radio, R-541/ARN-14D or R-540/ARN-14C, MCREE-329B	81-8162 or 81-8074	29.6
2	1	Dynamotor - DY-84/ARN-14A, MCREE-329B	81-2911	8.7
3	1	Indicator - Radio Control, ID-251/ARN, MIL-R-5821, 2C1565-251	81-3365	2.0
4	1	Control Panel - C-996/A, MIL-C-8174, S50D-2560, S51H-2514	81-2235	2.6
5	1	Indicator - Course, ID-351/ARN or ID-351A/ARN or ID-387/ARN	81-3371 or 81-3386	3.7
6	2	Indicator - Course, ID-250/ARN or ID-250A/ARN	81-3364 or 81-3374	5.0
7	1	Indicator - Course, ID-48/ARN	81-3362	2.0

9.8 '54

CONFIDENTIAL

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		ELECTRONICS (Weight Empty) (Cont)		
		Radar Identification Set AN/APX-6A		
1	1	Receiver-Transmitter - RT-279/APX	81-8195	44.5
2	1	Control Transponder Set - C-1158/APX, MIL-C-8327	81-2288	3.5
		ARMAMENT - GUNNERY (Weight Empty)		
*1	1	Fire control system - Fighter Interceptor, fixed MG-9 (not including nose racks & wiring)	52-4368	1196.3

CONFIDENTIAL

* See Paragraph 3.17.4.7.1 for A/C Using this System.

5 JAN 1955 '54 8.0

CONFIDENTIAL

APPENDIX I-B

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - GOVERNMENT INSTALLED

Item No.	Qty	DESCRIPTION	Aerno No.	Total Wt(Lb)
		ARMAMENT (Design Useful Load)		
1	24	Rocket - Aircraft, Folding Fin, 2.75" FFAR		432.0
2	6	Missiles - Air-to-Air, Hughes, GAR-1 and/or GAR-1B		801.0
		ELECTRONICS (Weight Empty)		
1	1	Coder - Transponder Set, KY-95/APX-25	81-1911	14.3
2	1	Control - Coder Group, C-1128/APX-25	81-2280	2.0
3	1	Mount MT-1151/APX-25		(wt. incl. in with item 1 above)
		MISCELLANEOUS (Useful Load)		
1	2	Personnel Parachute - Back-type (size 15x25x5 inches)		40.0
2	2	Survival Kit - Seat-type		36.0
		MISCELLANEOUS (Special Load)		
1	2gal	Anti-icing Fluid - Radome		18.7
		WEIGHT AND SPACE PROVISIONS ONLY (Weight Empty)		
1	1	Omni - DME - AN/ARN-21		57.5

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5 JAN 1955

~~CONFIDENTIAL~~

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Refer to Contractor's Bill of Materials, Equipment Section, for part numbers.

Item No.	Qty	Description
		LANDING GEAR (Weight Empty)
1	1	Shock Strut - Nose Landing Gear
2	1	Shock Strut - Main Landing Gear
3	1	Steer Damp Unit - Nose Gear
		POWER PLANT (Weight Empty)
1	2	Pump - Fuel Booster, Electric Motor-driven
2	1	Air/Oil Cooler
3	1	Probe - Ice Detector, Cook Electric
4	1	Interpretor - Ice Detector, Cook Electric
		PNEUMATIC (High Pressure) and HYDRAULIC SYSTEM (Weight Empty)
1	2	Pump - Hydraulic, Engine-driven, Variable Volume, Spec MIL-P-7740
2	1	Pump - Hydraulic, Air-driven
3	2	Accumulator - 3000 psi, Hydraulic
4	AR	Valves
5	AR	Cylinders
6	AR	Filters
7	AR	Pressure Switches
8	AR	Quick Disconnects
9	2	Flask - Air, 3000 psi
10	AR	Regulators

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description
		PHEUMATIC (High Pressure) and HYDRAULIC SYSTEM (Weight Empty) (Cont.)
11	1	Motor - Hydraulic, Alternator Drive
12	2	Reservoirs
		ELECTRICAL (Weight Empty)
1	2	Receptacle - External Power, 28-volt, D. C. with Shield
2	1	Receptacle - External Power, 115/200-volt Alternating Current, 3-Phase
3	1	Flasher - Position Light
4	2	Light Assembly - Tail Position, White
5	2	Light Assembly - Tail Position, Yellow
6	4	Light Assembly - Top and Bottom Fuselage
7	1	Taxi Light - 150-Watt, PAR 46
8	2	Light Assembly - Wing Tip (1 red and 1 green)
9	1	Control System - Cabin Temperature
10	1	Control System -NESA
11	2	Light - Landing, PAR 46-250 Watts
12	1	Intervalometer - Rocket Firing (Convair Spec 8-06311)
13	1	Intervalometer - Missile Firing, Convair Spec 8-06383

9.8 '54

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

ELECTRICAL (Weight Empty) (Cont.)

Item No.	Qty	Description
14	1	Generator and Control - A.C. 1000-VA, 115/200, 3-Phase, Convair Spec 8-06313
15	1	Actuator-Elevator Trim, Convair Spec 8-04303
16	1	Actuator - Aileron Feel and Trim, Convair Spec 8-04303
17	1	Actuator - Rudder Trim - Convair Spec 8-04303

ELECTRONICS (Weight Empty)

Item No.	Qty	Description
1	1	Radome
2	1	Antenna - Marker Beacon
3	1	Antenna - Glide Path
4	1	Antenna Assembly - Fin - Tip - UHF, Omni Range, Air-to-Air IFF
5	2	Antenna - Ground-to-Air, IFF
6	1	Mounting - MT-1060/U
7	1	Mounting - MT-1099/U
8	1	Mounting - MT-1439 /A
9	1	Mounting - MT-691/ARN-18
10	1	Mounting - MT-1161/ARN-14
11	1	Mounting - MT-962/ARN-14A
12	1	Mounting - MT-589/ARN-12 or MT-589A/ARN-12
13	1	Antenna - Data Link

FURNISHINGS AND EQUIPMENT (Weight Empty)

Item No.	Qty	Description
1	2	Ejection Seat Assembly
2	2	Ejection Seat Track

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description
		FURNISHINGS AND EQUIPMENT (Weight Empty) (Cont)
3	2	Hose - Anti-G Suit
4	2	Hose - Anti-G Suit
5	2	Connector Assembly - Anti-G Suit
6	1	Drogue Parachute
7	1	Holder - Card, Air Speed Correction
8	1	Card - Air Speed Calibration, Type AF21-E
9	2	Valve Assembly - Regulating Ejection Type, Anti-G, Type M-8
10	1	Canopy Air Spring
11	2	Holder - Card, Stand-by Compass & Radio Magnetic Indicator, AN-5800-
12	2	Card, Stand-by Compass & Radio Magnetic Indicator, AN-5823-1
*13	2	Grip - Control Stick Head, Yoke Type
		OXYGEN EQUIPMENT (Weight Empty)
1	2	Regulator - Oxygen for 1800 psi System - Type MB-2
2	1	Cylinder Assembly - Oxygen and Self-Opening Valve (AN6025AX646 cylinder and Kidde #800402 valve)
3	2	Tubing - Oxygen Mask to Seat, Quick Disconnect
4	2	Tubing - Oxygen, Seat, Quick Disconnect to Regulator
5	1	Valve - Oxygen Filler, (incl. AN780-3 or AN790-3 Nipple & Cap-On Filler End) AN6012-1A.
		FIRE DETECTION (Weight Empty)
1	2	Panels
2	2	Sets Cables

5 JAN 1955

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*This item Contractor furnished for those A/C not requiring installation of a Fire Control System. See Para 3.17.4.7.1 for A/C not requiring A Fire Control System.

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

PNEUMATIC (low Pressure), AIR CONDITIONING and ANTI-ICING SYSTEMS (Weight Empty)

Item NO.	Qty	Description
1	1	Heat Exchanger
2	AR	Valves
3	1	Air Turbine - Refrigeration Unit
4	1	Regulator - Cabin Pressure
5	1	Regulator "Q" Intelligence System
6	1	Pressure Regulator and Shut-Off, Anti-Icing
7	1	Safety Valve - Cabin Pressure

INSTRUMENTS (Weight Empty)

Item NO.	Qty	Description
1	1	Fuel Quantity Gage
2	1	Voltmeter - A.C. 0-150-volt
3	3	Indicator - Landing Gear Position, MIL-I-6839
4	1	Angle of Attack Pick-Up
5	1	Total Air Temperature Pick-Up
6	1	Indicator - Pressure Ratio - Turbo Jet
7	1	Indicator - Outside Air Temperature and Pick-Up
8	1	Indicator- Afterburner Position

9.8 '54

CONFIDENTIAL

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description
		ARMAMENT - GUNNERY (Weight Empty)
*1	1 set	Nose Racks and Wiring for MG-9 Fire Control
2	1	Mounting Base, to mount HAC part Nos. 401003-110, and 401005-100
3	1	Mounting Base, to mount HAC part No. 423014.
4	1	Mounting Base, to mount HAC part Nos. 463191-100, 463591-100 & 423036-110.
5	1	Mounting Base to mount HAC part No. 423033-120
		AUTOMATIC FLIGHT CONTROL SYSTEM (Weight Empty)
1	1	Pitch and Yaw Damping System
2	1	Pitch "G" Limiting System

*A/C Ser. No. AF54-1352 through 54-1358 are reworked by Contractor from CFE MG-3 nose racks and wiring, A/C Ser. No. AF54-1351 and 54-1359 and on are manufactured by Contractor.

5 JAN 1955

CONFIDENTIAL

APPENDIX I-D

SPECIAL EQUIPMENT - CONTRACTOR FURNISHED

Item No.	Qty	Description
1	2	Shield Assembly - Intake Duct...........................
2	1	Shield Assembly - Exhaust Tailpipe......................
3	4	Lock Assembly - Lower Missile Bay Doors..............
4	1	Cover Assembly - Canopy and Radome..................
5	2	Plug Assembly - Boundary Layer Duct. ....
6	4	Lock Assembly - Upper Missile Bay Doors. ....
7	1	Lock Assembly - Speed Brakes..........................
8	1	Cover Assembly - "Q" Intake...........................
9	2	Eyebolt Assembly - Wing Mooring Pad.................
10	1	Lock Pin Assembly - Canopy and Seat..................
11	2	Pin - Down Lock, Main Landing Gear ....
12	1	Pin - Down Lock, Nose Landing Gear ....
13	1	Pin - Alignment, Nose Landing Gear Steering ....
14	2	Support Assembly - Radar Door Hold-Open..............

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1, Handbook of Instruction for Aircraft Designers, Ninth Edition, Including Revisions up to and Including 1 April 1950.
1	3.1.6	Dimensions and General Data:

Requirement: Paragraph 0.17 - Dimensions (maximum of aircraft parts) "For aircraft whose ferry range is less than 3,000 miles, the design shall be such that the aircraft may be readily disassembled and packed for shipment by rail and oceanborne carrier. Since there are limitations in the size of container which can be transported by surface carrier, all components should be designed to fall within those limitations. The importance of providing suitable fastenings, bearing surfaces, etc., for use in shipment of components and spare parts should be recognized in their design. Whenever it is possible, without unduly compromising design, the disassembled parts of the aircraft shall be of suitable dimensions for packaging in containers of minimum excess cubage."

Deviation: Consideration need not be given in the design for disassembly of the airplane for shipment nor for limitation of dimensions expressly for this purpose.

Reason for Change and Remarks: In the interest of weight savings the airplane has not been designed to the packaging requirements.

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CONFIDENTIAL

9.8 '54

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
2	3.4	Structural Design Criteria

Requirement: Paragraph 3.1 - "The stress analysis criteria shall be as set forth in Specification No. C-1803. This document is classified Confidential".

Deviation: The structural criteria shall be as indicated in Contractor's Report No. ZU-8-027, "Stress Analysis Criteria for the TF-102A Airplane", in lieu of AF Specification C-1803-3 and R-1803-1 through R-1803-10. The Contractor's report shall be subject to approval of WADC.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range and purpose of the aircraft.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
3	3.4	Structural Design Criteria

Requirement: Paragraph 4.102 - "Detailed measures required by the Air Material Command for avoiding flutter together with the data to be submitted, are listed in Specification No. 1817. It will generally be found advantageous to construct the prototype aircraft using a conservative approach to flutter prevention such as complete compliance with the detail requirements of the specification."

Paragraph 4.112 - "The requirements for the prevention of control surface lift reversal are contained in Specification No. 1817."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
3 (Cont)		Paragraph 4.122 - "Requirements for the desired margin of safety against airfoil divergence are contained in Specification No. 1817."
		Paragraph 4.41 - "The structural vibration survey shall be conducted in accordance with the requirements of ANC Bulletin ANC-12."
		Paragraph 5.43 - "Requirements for flutter prevention of such devices as dive brakes, dive pull-out flaps, spoilers, scoops, etc., are given in AAF Specification No. 1817."
		Paragraph 5.441 - "The requirements for the static balance of control surfaces to prevent flutter are given in Specification 1817."
		Paragraph 5.442 - "The requirements for dynamic balance of control surfaces and the calculations involved in determining dynamic balance may be found in Chapter 4, Flutter, Vibration and Noise, and AAF Specification No. 1817."
	Deviation:	The results of aeroelastic theoretical and experimental investigations (as required by Convair Report ZD-8-003) for the F-102A airplane shall be considered applicable to the TF-102A airplane.

Reason for Change and Remarks: The airplane and components, excepting the fuselage forward of station 310, are common between the F-102A and the TF-102A. It should not be necessary to repeat the aeroelastic investigations for this type of change.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
4	3.4	Structural Design Criteria

Requirement: Paragraph 4.22 - "There are no detail requirements for the prevention of buffeting. However, aircraft shall be free from buffeting over the entire permissible speed range, except that buffeting may be acceptable as a stall warning if it occurs at a speed not exceeding 10 mph above the stalling speed."

Deviation: The airplane shall be free from objectionable buffeting over the entire permissible speed range.

Reason for Change and Remarks: No definite stall point exists.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
5	3.19.3.1	Insulating Materials

Requirement: Paragraph 4.620 - Installation of Soundproofing - "The installation of soundproofing shall be in accordance with Specification No. MIL-S-6144."

Deviation: Soundproofing shall not be installed.

Reason for Change and Remarks: The deletion of soundproofing is a weight savings feature.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
6	3.5.2.3	Wing Leading Edge
	3.6.4	Fin Leading Edge

Requirement: Paragraph 5.23 - "The installation of ice elimination equipment shall be in accordance with the requirements of Paragraph 11.3, Ice Elimination Systems."

Deviation: Not applicable to wing and tail. Space and structural provisions only for running wet system shall be made for anti-icing the leading edges of the wing and tail.

Reason for Change and Remarks: Convair studies indicate that operational requirements will be satisfactorily met without the use of an anti-icing system. The following Convair reports provide applicable information on those studies: T-1-111 dated 10-1-53, T-1-144 dated 3-1-54, A-8-56 dated 10-17-53 and A-8-61 dated 12-18-53.

* * * *

Deviation	Paragraph	
7	3.4	Structural Design Criteria

Requirement: Paragraph 6.120 - "Rigid structure shall be provided to support the crew members at all ditching stations for the load factors specified in Specification No. R-1803-5."

Deviation: Requirement not applicable.

Reason for Change and Remarks: Not applicable to this type of aircraft.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
7a	3.4	Structural Design Criteria

Requirement: Paragraph 6.124 - "Turn-over structure. This structure is required for primary, basic and advanced training type aircraft. Reference Specification R-1803-5."

Deviation: Requirement not applicable to this airplane.

Reason for Change and Remarks: The additional weight increase resulting from the installation of turn-over structure would be prohibitive. Also, the mass of structure required in the windshield-canopy area would not be conducive to good visibility. Unnecessary complication of the emergency escape system would also result. Approved by Mock-Up Board Inspection of 28-29 Sept. 1954.

* * * *

Deviation	Paragraph	
8	3.7.1.3.6	Pilot's Windshield

Requirement: (a) Paragraph 6.21 - "Flat panels in those areas used for vision in taking off, flying, aiming guns, and landing should be placed at an angle of incidence no greater than 55. if Type I, Grade A glass, or plastic of equivalent optical properties, is used."

(b) Paragraph 6.213 - "The design of transparent sighting areas shall be such that the theoretical variation in sight line deviation around the average sight line deviation over the entire area shall not be greater than ±0.5 mil."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
8 (Cont)	3.7.1.3.6	Pilot's Windshield

(c) Paragraph 6.213 - "Scanning area is defined as that portion of a transparent installation used for vision during taxiing, take-off, flying, landing and scanning from aircraft. The theoretical sight line deviation through any portions of the area inside a one-inch border shall not be greater than 1 mil, at the maximum angle of incidence normally used in the aircraft.

Deviation:

(a) The true angle of incidence may be 75 .

(b) The sight line deviation may be 6 mil maximum.

(c) This requirement will be determined at a later date.

Reason for Change and Remarks: (a) A flat windshield installed to HIAD requirements results in severe performance penalties. A sloping "V" windshield has been found to offer the best high speed performance.

(b) The sloping "V" windshield of the TF-102A results in high incidence angles with resultant sight line deviations. (At 75 incidence the deviation through glass is approximately 7 times as great as at 0 incidence.) The "V" windshield also requires vision through the margins of the glass for gun sighting. With present glass lamination manufacturing procedures, deviation through the margins of the glass panels is approximately twice that obtained one inch from the edge.

(c) The optics of the canopy transparent panel are unknown as to this date.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
9	3.7.1.3.6	Pilot's Canopy

Requirement: Paragraph 6.22 - "Specification AN-P-45 is to be complied with in the installation of transparent panels."

Deviation: Specification No. AN-P-45 is to be complied with, with the following exceptions:

(a) MIL-P-8184 shall be considered an applicable specification (AN-P-45, Paragraph B).

(b) Satisfactory stress levels of the transparent material will be established by static tests (AN-P-45, Paragraph D-3a).

Reason for Change and Remarks: (a) MIL-P-8184 is a later and superior material. (b) AN-P-45 limits fibre stresses to 650 psi above 77° F. It is intended to demonstrate that the canopy is satisfactory by means of an Air Force approved test program rather than maintain the stress level below 650 psi.

* * * *

10	3.19.1.1	Ejection Seat

Requirement: Paragraph 6.411 - "For upward ejection from the airplane, the seats shall be in accordance with Specification No. 25282."

Deviation: Ejection seats conforming to the Contractor's Specification No. 8-04322, as approved by WADC, shall be installed for the pilots.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
10 (Cont)	3.19.1.1	Ejection Seat (Cont)

Reason for Change and Remarks: To provide nonbottoming pilot's ejectable seats with improved arm rest ejection controls and 10° seat angle. Contractor's specification is in general accordance with Specification No. MIL-S-9479.

* * * *

11	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.413 - Standard Cockpits - "In order to insure that all cockpits will be uniform and suitable as possible to pilots, the dimensions and locations of certain items shall be observed. These dimensions and location areas shown on Drawings AD1 through AD3, which will illustrate the requirements for the standard cockpit."

Deviation: Drawing AD1 shall be applicable regarding cockpit dimensions and locations except for:

(a) The seat back angle shall be 10° in lieu of 17°.

(b) The vertical distance from the seat reference point to the reference point of the throttle grip shall be 7.80" in lieu of 13.5".

(c) The horizontal distance from the seat reference point to the reference point of the throttle grip shall be 19.25" in lieu of 19.00".

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont.)
11 (Cont)	3.7.1.3.1	Pilot's Compartment (Cont)

(d) The minimum horizontal distance from center line of seat to inboard edge of throttle grip shall be 12.50" in lieu of 13.00".

(e) The horizontal distance from the seat reference point to the neutral point of the stick grip shall be 20.78" in lieu of 19.00".

(f) The vertical distance from the seat reference point to the neutral point of the stick grip shall be 12.50" in lieu of 13.50".

(g) The seat adjustment shall be parallel to seat back in lieu of 1.5" forward in "up" position and 1.5" aft in "down" position.

(h) The horizontal distance from the seat reference point to the neutral rudder pedal location shall be 36.15" in lieu of 35.25".

(i) The cockpit depth shall be 40.00" in lieu of 39.50".

Reason for Change and Remarks: (a) The 10° seat back angle meets the requirements of specification number MIL-S-9479 dated 3-19-54.

(b) (1) To provide sufficient hand clearance between top of throttle control and cockpit longeron.

(2) Dimension given is with throttle in full military power position rather than "normal cruise", as there is no normal cruise" position for the throttle in a turbo jet powered airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
11 (Cont)	3.7.1,3.1	Pilot's Compartment (Cont)

(c) (1) To provide proper relationship between pilot and throttle with 10° seat.

(2) Dimension given is with throttle in full military power position rather than "normal cruise", as there is no "normal cruise position for the throttle in a turbo jet powered airplane.

(d) To provide sufficient hand clearance between throttle grip and side of cockpit. To maintain same design as F-102A

(e) To provide control stick clearance at seat and abdominal clearance at full aft stick travel.

(f) Control stick shortened two inches from original F-102 configuration as a result of flight evaluation and approved by the F-102A Mock-up Inspection.

(g) The seat adjustment conforms to Specification No. MIL-S-9479.

(h) Rudder pedal adjustment is increased to further compensate for seat adjustment method as required by Specification No. MIL-S-9479.

(i) To provide additional leg clearance beneath the instrument panel as required by F-102A RFA #105 and Item (J) under "Cockpit" of AMC ltr MCPPAF-5/RDF/lmh F-102.01, dated 12-1-52.

(j) To make specification agree with F-102A cockpit mock-up approved 28 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
12	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.415 (a) All aircraft shall be equipped with instrument flying inclosures that can be opened and closed in flight.

(b) The inclosures shall be permanently installed or stowed within the aircraft.

(c) The sheeting shall be easily removable so that it can be installed after take-off and removed prior to landing when desired.

Deviation: (a) The instrument flying inclosure will be the two color view limiter type, which does not permit opening and closing in flight.

(b) The instrument flying inclosure will not be permanently installed or stowed within the aircraft.

(c) It will not be possible to install the instrument flying inclosure after take-off or remove before landing.

Reason for Change and Remarks: (a) The configuration of the cockpit and the windshield precludes the possibility of the instrument flying inclosure being readily opened or closed in flight.

(b) It is impractical to permanently install the two-color view limiter type instrument flying inclosure. Stowage of the inclosure within the aircraft is precluded by space limitations.

(c) The configuration of the cockpit and the windshield precludes the possibility of the instrument flying inclosure being readily opened or closed in flight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

13 3.16.8.2 Interior Lighting

Requirement: Paragraph 6.416 - Lighting -"Instruments in fighter aircraft shall be lighted by ultra violet excitation."

Deviation: Instruments shall be lighted in accordance with Specification No. MIL-L-6423A, except as specified herein.

Reason for Change and Remarks: To conform to later requirements of AMC Manual 80-1.

* * * *

14 3.8.3 Auxiliary Landing Gear

Requirement: Paragraph 7.10 - "Any aircraft equipped with a tri-cycle gear shall be provided with a tail skid or buffer...."

Deviation: A tail skid or buffer shall not be required.

Reason for Change and Remarks: To save weight plus experience with the YF-102 airplane indicates that a tail skid or buffer is not necessary.

* * * *

15 3.8 Alighting Gear

Requirement: Paragraph 7.60 - "Air loads existing at 150% of sea level stalling speed with flaps shall appear to act on the landing gear installation.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
15 (Cont)	Deviation:	Air loads existing at 270 knots, shall appear to act on the landing gear installation.

Reason for Change and Remarks; Since there is no definite stall point as on conventional aircraft, an arbitrary selection of speed is necessary. In addition, this airplane is not equipped with flaps.

* * * *

16	3.8	Alighting Gear
	Requirement:	Paragraph 7.60 - "It shall be possible to operate the landing gear at all speeds up to 175 percent of the stalling speed."
	Deviation:	It shall be possible to operate the landing gear at all speeds up to 270 knots.

Reason for Change and Remarks: Due to the flying characteristics of this airplane, it is necessary to design the alighting gear to operate at higher speeds than 175% of stalling speed. Since there is no definite stall point as on conventional aircraft, an arbitrary selection of speed is necessary.

* * * *

16a	3.8.4.5	Retracting, Extending and Locking Systems - Nose Landing Gear
	Requirement:	Paragraph 7.610 - "The design shall be such that the wheels are prevented from continuously rotating in the retracted position."

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
16a (Cont)	**Deviation:**	The design of the nose landing gear will not incorporate a device to prevent rotation of the nose wheel in the retracted position.

Reason for Change and Remarks: To save weight and simplify design. (Ref RFA No. 8 of TF-102A Nose Mock-Up Inspection of 28-29 September 1954.)

* * * *

17 3.8 Alighting Gear

Requirement: Landing Gear Retracting Mechanism - Paragraph 7.611, Landing Gear Controls-"Controls shall conform to Chapter 9,Controls". Paragraph 9.5, Wing Flap and Landing Gear Controls -"Wing flaps and landing gear actuating systems shall conform to Chapter 10, Actuating System". Refer to Paragraph 10.4, Mechanical Systems. Paragraph 10.400, Bearings - "All moving joints between push-pull rods, levers and brackets shall have anti-friction bearings in accordance with Paragraph 8.31, Anti-Friction Bearings."

Deviation: Plain bearing with adequate lubrication facilities, where practical, and consistent with acceptable alighting gear practice may be used, providing satisfactory information is submitted to and approved by WADC substantiating their use.

Reason for Change and Remarks: Anti-friction bearings would impose impracticable installation problems and excessive weight due to the large design loads and limited space.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
18	3.16.11.2	Signal Assemblies

Requirement: Paragraph 7.611a - "The landing gear indicating system shall be in accordance with Specification No. 32300.

Deviation: The landing gear indicating system shall be installed in accordance with Specification No. MIL-E-7563 as deviated in this appendix.

Reason for Change and Remarks: To specify applicable specification.

* * * *

Deviation	Paragraph	
19	3.8.2.5	Retracting, Extending and Locking Systems

Requirement: Paragraph 7.611k - "Leakproof sealed units, using AF approved low travel switches (reference Specification MIL-S-6743), shall be installed on the main landing gear in such a manner that the initial compression motion of the shock absorber actuates the switch. The purpose of these switches is to prevent retraction of the landing gear while the airplane is on the ground. They shall be wired in series with each other and shall be capable of being adjusted to operate at 1/2 inch plus 1/4 inch minus 0 inch from the shock strut fully extended position. These shall serve to operate a continuous duty type solenoid for unlocking the landing gear control lever."

Deviation: A safety switch shall be required on the left hand main landing gear shock strut only.

Reason for Change and Remarks: The Contractor's experience has shown that two switches in series decrease the overall circuit reliability as well as increase weight, circuit complication

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | AMC Manual 80-1 (Cont)

19 (Cont) Reason for Change and Remarks (Cont)
and maintenance access problems. Practicability of a switch on the left main gear is borne out by YF-102 flight tests to date.

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20 3.8.2.6 Main Landing Gear Doors and Fairings
3.8.4.6 Nose Landing Gear Doors and Fairings

Requirement: Paragraph 7.701a - "Landing gear doors shall be designed to close when the landing gear is in the fully extended position."

Deviation: The landing gear doors need not be designed to close when the landing gear is in the fully extended position.

Reason for Change and Remarks: The above requirement is basically for aircraft with low thrust to reduce drag during take-off. Also, due to the increase in weight and the complexity in design, it is not deemed advisable to comply with the above requirement. To maintain design identical to F-102A airplanes.

* * * *

21 3.2.11 Standard Parts

Requirement: Paragraph 8.101 - Threads - "Threaded holes in fitting shall be avoided due to high original cost and the limited serviceability of the fittings. The attachment of fittings to the aircraft structure shall not involve the use of extensive threaded surfaces."

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15 OCT 1954 - 5 JAN 1955

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
21 (Cont)	Deviation:	Where threaded holes in fittings, structure, or bosses cannot be avoided, the part shall be designed to permit machining and threading for the next larger size standard screw thread, or shall employ removable externally-threaded inserts, for the purpose of replacing the working threads.
	Reason for Change and Remarks:	To reflect later USAF policies as evidenced in July 1951 revision of HIAD.

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22	3.2.11	Standard Parts
	Requirement:	Paragrapah 8.20 - Rivets - "All rivets must conform to those shown in the Army Air Forces Standards Book."
	Deviation:	(a) All rivets must conform to those shown in the USAF Standards book and ANA Bulletin 147. (b) Corrosion-resistant steel rivets conforming to Contractor's Standards Q-4304 and Q-4310 may be used. (c) DuPont Blast Free rivets including those with shaved heads may be used subject to the provisions of AMC letter MCPPAF-6 (WCSF-6) dated 4 December 1953, and MCPPAF -6 (WCSF-6) dated 24 July 1954. (d) Huck lockbolts may be used subject to the provisions of AMC letters to Huck Manufacturing Co, MCREXA71 dated 22 November 1949, MCREXA71 dated 14 January 1949, MCREXA71 dated 26 March 1948 and TSEAC 11B dated 1 July 1947.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
22 (Cont)	Deviation: (Cont)	(e) Series 200 and 260 Jo Bolts may be used subject to the provisions and limitations of WADC letter WCLSJ-3 dated 18 August 1954 to National Screw and Manufacturing Co of California.
		(f) Contractor's Q-4326 rivets installed per Contractor's Standard Q-2008 with Q-7106 washers may be used in construction of integral fuel tanks.

Reason for Change and Remarks:

(a) To add more recent standard fastenings now recognized by USAF.

(b) These Contractor standards have been approved by AMC letter.

(c) Blind fasteners are necessary and duPont blast-free rivets require less back clearance and prevent corrosion from products of explosion.

(d) To provide a high strength fastener with adequate clamp-up, to avoid the weight penalty of screw and nut combinations in permanent joints, and to provide tighter fits.

(e) To provide a high strength blind fastener and to avoid the weight penalty of screw and nut plate combinations in permanent joints.

(f) These rivets are required for fabricating of integral fuel tanks in accordance with Contractor's Report No. 8-00010 submitted to WADC and approved.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
23	3.2.11	Standard Parts
	Requirement:	Paragraph 8.21 - Bolts - "AN standard bolts and screws shall be used in the primary structure of the aircraft."
	Deviation:	(a) AN standard bolts and screws and the standard bolts and screws listed in ANA Bulletin 147 shall be used in the primary structure of the aircraft. In addition, the MS 20,004 series bolts may be used. (b) Corrosion-resistant screws may be used. (c) "Nylock" self-locking bolts and screws may be used subject to the provisions of WADC letter to the Nylock Corp WCLSJ-3 dated 18 March 1954.

Reason for Change and Remarks:

(a) To add later, more convenient fasteners recognized by industry and the services.

(b) Corrosion-resistant screws are for use in the vicinity of compass installations where nonmagnetic materials are required.

(c) Nylock screws to be used in order to keep windshield post sizes to a minimum in order to keep within Mock-Up requirements. (Reference Convair letter 6-3137 dated 16 July 1953 and AMC letter MCPPAF-6 (WCOWF-6)dated 18 August 1953).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
24	3.2.11	Standard Parts

Requirements: Paragraph 8.21 - Bolts "Bolts loaded in shear and subject to reversals of load shall be installed to close tolerance holes with no perceptible play."

Deviation: Shear bolts in pin-jointed structures subject to reversals of load shall be installed in close tolerance holes with no perceptible play. The term "no perceptible play" is interpreted as the actual hole diameter not exceeding the nominal bolt or pin diameter by more than 0.0015 inch for bolts or pins of 1.000 inch diameter or less, and by more than 0.0020 inch for bolts or pins with diameters larger than 1.000 inch up to and including 1.625 inch.

Reason for Change and Remarks: To define the requirements stated above in accordance with the Contractor's practice.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
25	3.2.11	Standard Parts

Requirement: Paragraph 8.22 - Nuts: "All nuts used in aircraft structures which may require removal shall be either castellated nuts conforming to Specification No. MIL-N-6034, to be locked with cotter pins, or self-locking nuts conforming to Specification No. AN-N-5 or AN-N-10.

Deviation: Applicable, except that nuts for NAS series bolts may be used, and except that nuts for corrosion and heat-resistant screws may be used.

Reason for Change and Remarks: To permit use of nuts corresponding to nonstandard bolts and screws authorized.

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26	3.2.11	Standard Parts

Requirements: Paragraph 8.221 - Self-Locking Nuts: Self-locking nuts and plate nuts shall be of an approved type, selected from those listed in ANA Bulletin 159.

Deviation; Elastic Stop Nut Corporation, Flush, 100°, Slotted Nut No. 52-1650-02 may be used.

Reason for Change and Remarks; To permit the removal of thin structural parts such as Fin Tip sections for repairs and maintenance.

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APPENDIX II

DEVIATIONS FROM APLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
27	3.2.11	Standard Parts

Requirement: Paragraph 8.24 - (1) "Taper pins shall be used in all permanent connections seldom broken and where absence of play is essential." (2) "Cylinder pins may be used... They shall be safetied by peening the ends into shallow countersunk recesses."

Deviation: (1) The use of springpins shall be permitted providing they are installed in accordance with Specification MIL-P-10971 (ORD.), and MS 33547 (ASG).

(2) When cylindrical pins are used safetying may be by staking.

Reason for Change and Remarks: (1) Springpins are lighter in weight and are easier to remove when necessary to do so. Also, the use of rollpins simplifies fabrication. (2) Contractor prefers the staking safetying method since it is more practical both time and cost-wise and is a method used universally.

* * * *

28	3.2.11.1	Bearings

Requirement: Paragraph 8.31 - "Control surface hinges and all moving joints between push-pull rods, levers, and brackets shall have anti-friction bearings in accordance with Specification AN-B-4 and Air Force-Navy Aeronautical Standard AN200, AN201, AN206, and AN207."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
28 (Cont)	Deviation:	(1) Applicable except that spherical self-aligning bearings may be used for actuating cylinder pivots. Relubrication shall be provided where practicable. Each specific application shall be submitted to WADC for approval. (2) Shafer - Self aligning - Double row - positive seal Series "A" bearings may be used in Elevon and Rudder hinges. Each specific application shall be submitted to WADC for approval. (3) Fafnir - Self aligning - Sealed ball bearing - Series KP-49-BS may be used on lower rudder hinge. Self aligning portion shall be used for assembly misalignment only. (4) Plain bearings with adequate lubrication facilities, where practical and consistent with acceptable alighting gear practice may be used. Each specific application shall be submitted to WADC for approval. (5) Fafnir bearings of the DW series may be used in the primary controls. (6) Fafnir rod ends of the RE series may be used on push-pull rods in the primary and secondary controls.

Reason for Change and Remarks: (1) Anti-friction bearings would impose impraticable installation problems and excessive weight due to the required large design loads.

(2) Space limitations require these bearings and reflect appreciable weight savings.

9.8 '54

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
28 (Cont)	3.2.11.1	Bearings (Cont)

(3) No AN Bearings of this size, type and capacity available.

(4) Anti-friction bearings would impose impracticable installations problems and excessive weight due to the required large design loads.

(5) To simplify design, reduce control system play and save weight.

(6) To reduce control system play.

* * * *

29 3.2.11.1 Bearings

Requirements: Paragraph 8.312 - "The static limit loads for anti-friction bearings shall not exceed the minimum non-Brinnell loads given in Specification AN-B-4."

Deviation: The following shall be the bearing limit load ratings:

Bearings	Limit Load Ratings
AN 200KP Series	8, $000ND^2$
AN 201KP Series	8, $000ND^2$
AN202KP Series	8, $000ND^2$
AN 200KS Series	4, $000ND^2$
AN 206DSP Series	3, $000ND^2$
Ball Bearing Rod Ends	3, $000ND^2$

N = Number of Balls
D = dia of balls

Reason for Change and Remarks: The above loads are those approved by WADC Ltr WCSWF 1/WCS/HLM dated 18 Aug. 1952.

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CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

30 3.20.1.2 Ground Air Conditioning

Requirement: Paragraph 8.412 - "An opening in the engine cowling for ground heaters will be provided for, by either an accessory door with minimum dimensions of 12 inches diameter or an easily removable section of cowling of equivalent size."

Deviation: No engine cowling is required. However, provision shall be made for ground heating of the accessory compartment.

Reason for Change and Remarks: Engine cowling is not applicable to this type of power plant installation. Means will be provided for obtaining ground heat for engine accessories.

* * * *

31 3.4 Structural Design Criteria

Requirement: Paragraph 8.42 - "Cowling and its supporting structures shall be designed to the strength requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria For The TF-102A Airplane" Which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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9.8 '54

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
32	3.2.11	Standard Parts

Requirement: Paragraph 8.440 Quick Acting Fasteners - Cowling fasteners used on the external surfaces of Aircraft in attaching cowling, inspection doors, etc., shall be flush with the surface, with the fasteners in the locked position, and shall conform to Specification AN-F-8. They shall be selected from the approved fasteners covered by ANA Bulletin 248 and Standard Sheet and 10076.

Deviation: It shall be permissible to use shear type camloc fasteners. Drawings of each application shall be submitted for approval.

Reason for Change and Remarks: To provide quick removal of access doors, to permit carrying normal fuselage shear with a minimum of space and weight being utilized. (Approval obtained in AMC Ltr dated 24 December 1953).

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
33	3.22.4	Hoisting

Requirement: Paragraph 8.511 - Hoisting. - "Hoisting slings shall be provided and carried as special equipment."

Deviation: Provision for carrying hoisting slings in the airplane is not required.

Reason for Change and Remarks: Insufficient space in the airplane available for stowage.

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17 JAN 1955

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

34 3.20.1.2 Ground Air Conditioning

Requirement: Paragraph 8.52 - Ground Handling. ".... provisions will be made in the aircraft fuselage at applicable stations requiring ground heating for attaching of AF standard 12-inch ground heater duct."

Deviation: Provision for attachment of the specified ground heater ducts is not required.

Reason for Change and Remarks: Provision shall be made for obtaining ground heat for the cockpit as described in this model specification.

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35 3.4 Structural Design Criteria

Requirement: Paragraph 8.520 - "The alighting gear and its supporting structure shall be designed to the towing requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria For The TF-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

36 3.4 Structural Design Criteria

Requirement: Paragraph 8.521 - " The mooring fittings and the structure to which they are attached shall be designed in accordance with Specification No. C-1803 ......"

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria For The TF-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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37 3.22.3 Mooring Provisions

Requirement: Paragraph 8.521a - (1) "A mooring fitting shall be provided on the fuselage of each aircraft near the tail." (2) "For aircraft of 16,000 poinds design gross weight or less, mooring fittings attached to the wing, one on each side of the plane of symmetry and as near as practicable to the middle of the semispan, shall be provided. For larger aircraft, two wing mooring points on each side of the plane of symmetry shall be provided."

Deviation: (1) Mooring fitting on the fuselage tail shall not be required.
(2) One wing mooring point on each side of the plane of symmetry shall be provided.

9.8 '54

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** AMC Manual 80-1 (Cont)

37 (Cont) Reason for Change and Remarks: (1) Due to Delta wing configuration, aft mooring provisions are incorporated in the outboard end of wing. (2) Due to the short wing span it is not practical to provide two mooring points on each side.

* * * *

38 3.22.5 Leveling:

Requirement: Paragraph 8.531 (Leveling Provisions) - "Each aircraft shall be furnished with provisions for obtaining the true level attitude of the longitudinal and lateral axes of the aircraft while the aircraft is being weighed, while structural alighnment is being made, or while armament is being adjusted and aligned. Provisions for plumb bobs, which permit a free fall of 36 inches, are desired; however, if brackets are used they shall be 18 to 20 inches apart, shall be located on the left side of the fuselage and should be forward of the wing. All jig points and leveling provisions shall be suitably marked or labeled in accordance with Specification AN-M-18."

Deviation: (a) Lateral leveling brackets shall be located symmetrically about center line of airplane.

(b) Longitudinal leveling brackets shall be located in the aft right hand missile bay.

(c) Leveling brackets shall not be located forward of the wing.

(d) Leveling provisions shall be installed in accordance with Specification No. MIL-M-6756.

9.8 '54

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
38 (Cont)	3.22.5	Leveling (Cont)

(e) Lateral leveling brackets shall be spaced 14 inches apart. Longitudinal leveling brackets shall be 21 inches apart.

Reason for Change and Remarks: (a) and (b) Due to structural and equipment density, it is impractical to locate brackets on left side of airplane.

(c) The delta wing configuration renders it impractical to comply. Leveling provisions shall be forward of the main landing gear.

(d) To establish use of later specification which supersedes AN-M-18.

(e) Spacing chosen permits mounting on existing structure. Conforming to requirement of 18 to 20 inches apart would require additional bracketry with resultant weight increase.

* * * *

39	3.7.1.2	Construction - Fuselage

Requirement: Paragraph 8.62 - "..... if hinged doors are used, the hinges shall be located so that the air stream tends to keep them closed, ..."

Deviation: It shall be permissible to provide access doors hinged at the top along a straight line section with fasteners provided to secure in a closed position, and provided specific application approval is obtained from WADC.

Reason for Change and Remarks: Installation of access doors hinged at top precludes the necessity of additional structure to provide for hinge support on the fore side of the door, which permits weight savings.

CONFIDENTIAL

9.8.54

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

39 (Cont) 3.7.1.2 Construction - Fuselage (Cont)

(Ref. CVAC Ltr 6-1113 of 12 March 1953, AMC MCPPAF-6/RGA/feb dtd 10 May 1954.

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40 3.2.2 MATERIALS: Magnesium castings.

Requirement: Paragraph 8.640 - "In the design of magnesium alloy castings, wall thickness shall not be less than 5/32 inch, and generous fillets shall be provided at junctures of all sections."

Deviation: Wall thickness of magnesium alloy sand castings may be of 1/8 inch thickness (minimum), subject to WADC approval of each application.

Reason for Change and Remarks: The structural strength of the 1/8 inch thick magnesium alloy sand casting is considered adequate and will result in considerable weight savings.

* * * *

41 3.4 Structural Design Criteria

Requirement: Paragraph 8.83 - "For design strength and rigidity requirements see AAF Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria for the TF-102A Airplane" which is subject to WADC approval.

9.8 '54

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
41 (Cont)	3.4	Structural Design Criteria (Cont)

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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42	3.8.2.5	Retracting, Extending and Locking Systems

Requirement: Paragraph 9.14 - "Emergency" controls shall be properly located and safe-guarded to preclude inadvertant operation.

Deviation: Emergency landing gear control shall not be equipped with a guard.

Reason for Change and Remarks: Decision of F-102A Mock-Up Board of 28-29 July 1954. Ref. RFA #39.

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43	3.10	Surface Control System

Requirement: Paragraph 9.22 - "Whenever push-pull tube systems are used in flight controls, they shall be arranged that all the tubes are in tension for the greater load for which the system is designed."

Deviation: The greater load may be in compression in some cases.

Reason for Change and Remarks: Space available makes it undesirable to complicate the design to meet the above requirement in all cases. (Request submitted by CVAC Ltr 6-5877 dated 30 November 1953, approved by AMC Ltr MCPPAF-6 (WCSF-6) dated 25 January 1954.)

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
44	3.10.1	Primary Flight Control System

Requirement: Paragraph 9.305 - "The locking device shall provide for selective locking of the aileron, elevator and rudder controls and it shall also incorporate the feature of simultaneous locking of all controls at the will of the pilot."

Deviation: The above requirement shall not be applicable.

Reason for Change and Remarks: The above requirements have been deleted by later revisions to AMC Manual 80-1. To comply would unnecessarily complicate the control system and add weight.

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Deviation	Paragraph	
45	3.4	Structural Design Criteria

Requirement: Paragraph 9.307 - "The design of the control system, and its structural supports, shall be based on rigidity and the elimination of deflection, as well as upon the ultimate strength requirements of Specification No. C-1803."

Deviation: The requirement of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria for the TF-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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15 OCT 1954

9.8 '54

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

46 3.10.1 Primary Flight Control System

Requirement: Paragraph 9.308 - "All cables shall be separated by at least 3 inches, preferably more."

Deviation: Cable spacing may be closer than 3 inches where necessary. Each particular case shall be submitted to WADC for approval.

Reason for Change and Remarks: Maximum cable spacing will be provided; however, in some cases it is impracticable to maintain three-inch spacing due to limited space available. (Approved by AMC letter MCPPAF-6 (WCSF-6) RGA/feb dated 29 June 1954.)

* * * *

47 3.10.1 Primary Flight Control System

Requirement: Paragraph 9.31 - Duplicate Controls - "This paragraph, under certain conditions, requires duplicate control system.

Deviation: A single cable control system shall be provided for each of the primary control systems.

Reason for Change and Remarks: The delta-wing configuration requires a control system mixer which does not lend itself to a practical dual system. Dual cable systems will unduly increase the control system friction forces and weight.

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15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

48 3.10.1.1 Flight Station Controls

Requirement: Paragraph 9.324 - "The aircraft structure, auxiliary controls, furnishings, instruments, etc., shall clear by at least 1-1/2 inches the cockpit primary air control items in all positions...."

Deviation: A minimum clearance of 1-1/2 inches shall be maintained between the control stick grip and aircraft structure; however, the minimum clearance between other control components and aircraft structure may be less than 1-1/2 inches.

Reason for Change and Remarks: Maximum clearance will be provided; however, in some cases it may be impractical to maintain the full clearance specified in the HIAD.

* * * *

49 3.14.1 Instruments

Requirement: Paragraph 9.403 - "Tab position indicators shall plainly identify, by day or night, the main control surface affected by the trim control...."

Deviation: Tab position indicators shall not be required. A single light shall be installed to indicate when surfaces are in neutral (take-off) position. This light shall come on when all of the surfaces are trimmed neutral by the auto-trim switch.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
49 (Cont)	Reason for Change and Remarks:	USAF request at F-102A Cockpit Conference. The pilot needs only to know trim position prior to take-off.

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50	3.8.2.5	Retracting, Extending and Locking System (Main Landing Gear)
	Requirement:	Paragraph 9.521 - "The landing gear control lever shall be installed with a solenoid released locking device which functions to preclude motion of the control lever from neutral to the "up" position when on the ground." "For hydraulic or pneumatic retracting systems where the landing gear lever operates selector valves electrically by means of a conventional control circuit, a separate "contact" (multi-pole switch) will be closed for each selector valve energized."
	Deviation:	(1) A solenoid released locking device shall not be required. (2) A separate "contact" (multi-pole switch) for each selector valve energized shall not be required.

Reason for Change and Remarks:

(1) The safety switch on the main gear prevents the gear from being retracted when on the ground even though the landing gear control switch is moved to the "up" position.

(2) The landing gear control switch shall be in accordance with Contractor's Specification Control Drawing No. 8-04227 which is to be submitted to AMC for approval.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont).
50a	3.12.11	Propulsion System Controls

Requirement: Paragraph 9.603 - Engine Control Units - "For irreversible-type units, it shall be impossible to operate the control from any point in the system other than the hand control."

Deviation: It shall be possible to operate the engine control from any point between the student's and instructor's interconnect and their respective hand controls.

Reason for Change and Remarks: The irreversible-type unit shall be located in the interconnect linkage between the student's and instructor's power quadrant. It is not advisable to incorporate the irreversible unit in the power quadrants because of design complications and resultant increased weight.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont).
51	3.12.11	Propulsion System Controls

Requirement: Paragraph 9.604 - "In single-engine aircraft, at least six inches clearance shall be provided between the handle of the throttle lever or power lever and the handle of the control located nearest to it. Training aircraft shall have the controls so arranged that either the instructor (pilot) or student may have complete control."

Deviation: (1) The power control lever clearance may be reduced from the HIAD requirement.

(2) Both the student and instructor shall have control of the range from idle to maximum or take-off power. Only the student shall have control for starting and shut-down.

15 OCT 1954

[redacted]

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   AMC Manual 80-1 (Cont)

51 (Cont)

Reason for Change and Remarks: (1) The ejection seat clearance, landing gear lever, oxygen panel location prevents adherence to this specification.

(2) To reduce weight and complexity no interconnect is provided between the instructor's and student's throttle for sideward motion of the throttle.

The above approved by Mock-Up Board of 28-29 Sept. 1954.

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52   3.12.11   Propulsion System Controls

Requirement: Paragraph 9.621 - "All turbo-jet aircraft shall be provided...... and having a functional characteristic substantially in accordance with Figure 9.1."

Deviation: Thrust augmentation is in the regime between a point just forward of idle to maximum thrust.

Reason for Change and Remarks: The deviation, as stated, is a requirement of the engine performance for this airplane.

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5 JAN 1955

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
53	3.16.4	Equipment Installation
	3.16.5	Wiring
	3.16.6	Bonding
	3.16.8	Lighting

Requirement: Paragraph 10.1 - Electrical System - "This paragraph and subsequent subparagraphs specify Specification Nos AN-E-17, 32300, 94-32265, AN-W-14 and AN-B-10 as the applicable specifications."

Deviation: Specifications MIL-E-7080, MIL-E-7563, MIL-L-6503 (USAF), MIL-W-5088 and MIL-B-5087 respectively shall apply.

Reason for Change and Remarks: To specify applicable specifications.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
54	3.15.2	Pneumatic System

Requirement: Paragraph 10.303 - "Assume air bottle pressure to be 1800 psi. All air bottles used for emergency operation of hydraulic or pneumatic systems shall be selected for an initial air charge of 1800 psi. (Pressure lower than this results in the use of larger size bottle and higher pressure is not available in service.)"

Deviation: Compressed air bottle pressure may be 3000 psi.

Reason for Change and Remarks: To agree with design storage pressure of the pneumatic system

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

55 3.2.11.1 ----

Requirement: Paragraph 10.400 - Bearings - "All moving joints between push-pull rods, levers, and brackets shall have antifriction bearings in accordance with Paragraph 8.31, Anti-Friction Bearings."

Deviation: All moving joints between push-pull rods, levers, and brackets shall have anti-friction bearings in accordance with Specification No. AN-B-4 and Air Force-Navy Aeronautical Standard AN-200, AN-201, AN-202, AN-206 and AN-207, except that:

(1) Spherical self-aligning bearings may be used in applications where specific application approval is obtained.

Reason for Change and Remarks: Anti-friction bearings would impose impracticable installation problems and excessive weight due to the required design loads.

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56 3.10.1 Primary Flight Control System

Requirement: Paragraph 10.410 - "Control cables shall conform to Specification No. AN-C-43 or AN-C-48."

Deviation: Hy-Co-Span may be used in lieu of cables conforming to Specification No. AN-C-43 or AN-C-48.

Reason for Change and Remarks: The use of Hy-Co-Span simplifies the system by elimination of tension regulators and reduces weight. (Approved by AMC letter dated 9 April 1954)

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

57 3.10 Control Systems

Requirement: Paragraph 10.412 - "Fairleads shall be used wherever necessary to keep cables from chafing and slapping against parts of the aircraft in flight or in taxiing .... They shall be of nonhygroscopic, nonabrasive material, and split to permit easy removal."

Deviation: It shall be permissible to use fixed fairleads with holes sufficiently large to permit withdrawal of cables.

Reason for Change and Remarks: To reduce friction. (Request submitted by Convair letter 6-5877 dated 30 November 1953, approved by AMC letter MCPPAF-6 (WCSF-6) RGA/met dated 25 January 1954.)

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58 3.2.11.1 Bearings

Requirement: Paragraph 10.421 - "Ball and socket joints shall not be used in control systems."

Deviation: Spherical self-aligning bearings may be used for actuating cylinder pivots.

Reason for Change and Remarks: Anti-friction bearings would impose excessive installation problems and weight increases due to the required large loads.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
59	3.19.4	Emergency System

Requirement: Paragraph 11.22 - "An overheat detector system shall be installed in all turbo-jet .... in accordance with Specification No. 41409.

Deviation: The overheat detector system shall be as specified by the Procuring Agency.

Reason for Change and Remarks: The Edison continuous detector is used on this airplane to detect overheat in the aft engine compartment.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
60	3.19.2.4	Windshield Cleaners

Requirement: Paragraph 11.31 -"Transparent surfaces, windshield wipers, external anti-icing sprays and heated-air de-icing, defrosting and defogging systems for maintaining vision through the transparent areas which are necessary to the performance of the mission shall conform to Specification No. 40435.

Deviation: Means for maintaining forward vision during rain may be other than by windshield wipers.

Reason for Change and Remarks: Means for maintaining forward vision during rain shall be installed; however, this may be accomplished by a method other than wipers as covered by Specification No. MIL-T-5842.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
61	3.20.1.1.1	Air Conditioning-Pressurization

Requirement: Paragraph 12.22 - "Safety limits of pressurization and Figures 12-2 and 12-3."

Deviation: Maximum rate of expansion limits as specified in Paragraph 12.22 and Figures 12-2 and 12-3 are not applicable for pilot emergency escape from the aircraft.

Reason for Change and Remarks: To keep the RGE within the specified limits, a time delay of approximately two seconds would be required to shut off the cabin air supply and dump the cabin pressure down to a safe level before opening canopy. This time delay is excessive for an emergency escape.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
62	3.20.1	Air Conditioning

Requirement: Paragraph 12.30 - ".... provision shall be made for selecting automatic maintenance of a lower pressure differential during combat flight in accordance with requirements of Paragraph 12.22, Safety Limits of Pressurization.

Deviation: A lower pressure differential during combat flight is not provided.

Reason for Change and Remarks: The intent of this requirement is met by pressure suit provisions.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
63	3.20.1	Air Conditioning

Requirement: Paragraph 12.341 - "Closing of the shut-off valves shall actuate simultaneously the ram air-inflow valve mechanism so as to insure continued cabin ventilation when the pressure source is not used."

Deviation: It shall not be required that the closing of the shut-off valve simultaneously actuates the ram air-inflow valve mechanism.

Reason for Change and Remarks: Simultaneous actuation of the ram air-inflow valve mechanism with operation of the emergency shut-off valve would dump the cockpit pressure with attendant adverse physiological consequences at high altitudes.

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Deviation	Paragraph	
64	3.20.1	Air Conditioning

Requirement: Paragraph 12.342 - "A valve in the ram air line shall be mechanically or electrically linked with both the emergency pressurized air shut-off valve described in 12.341, Emergency Shut-Off Valve, and the cabin air dump valve described in 12.360, General. The linkage shall provide for positive actuation of the threee valves when operating personnel desire to actuate any one of the three."

Deviation: A valve in the ram air line shall be electrically linked with the cabin air dump valve and the emergency shut-off valve. Actuation of the cabin air switch to "RAM" actuates all three valves.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

64 (Cont) Reason for Change and Remarks: Actuation of cabin air switch to "Off" position closes emergency shut-off valve, but does not open dump valve or ram air valve, thus holding cabin air pressure which is in conformance with deviation requested, for Paragraph 12.341 of HIAD.

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65 3.20.1 Air Conditioning

Requirement: Paragraph 12.345 - "Water separator and drain."

Deviation: Water separator and drain are not required.

Reason for Change and Remarks: Provision for water separator is deemed inadvisable because of the extremely short duration of sea level flight in the normal tactical application of the airplane. Such provisions impose penalties in weight and space of the low pressure pneumatic system.

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66 3.20.1.1.1 Air Conditioning

Requirement: Paragraph 12.350 - General - "The cabin pressure to be maintained at various flight altitudes shall be as shown in Figure 12-4 for aircraft having one or two crew members, etc."

Deviation: The cabin pressure schedule will be as per Paragraph 3.20.1.1.1.

Reason for Change and Remarks: This pressure schedule provides more adequate cockpit pressures for pilot environment at altitude.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
67	3.20.1	Air Conditioning

Requirement: Paragraph 12.351 - "Control of rate of pressure change."

Deviation: Control of rate of pressure change need not be provided.

Reason for Change and Remarks: The necessity for switching from normal to combat is deleted to maintain design identical to F-102A airplane.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
68	3.20.1	Air Conditioning

Requirement: Paragraph 12.372 - Cabin Air Inflow and Mixing Flow Package for Jet-Propelled Aircraft. - "The cabin flow and mixing valve package shall comprise a dual valve arrangement.."

Deviation: Considered not applicable per reason noted.

Reason for Change and Remarks: The single butterfly refrigeration unit bypass valve performs the intent of the above requirement.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
69	3.20.1	Air Conditioning

Requirement: Paragraph 12.376 - (Referring to Specification R-40659-A, Heating, Aircraft Cabin General Specification for; Paragraph D-1b.) - "The temperature of each crew station and the cargo or passenger compartment shall not vary more than 10 degrees Fahrenheit (5.5 degrees Centigrade) between any two points ...."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
69 (Cont)	Deviation:	The air temperature in the cabin may vary more than 10 degrees Fahrenheit between any two points. The distribution system will maintain air temperatures immediately surrounding the pilot as uniformly as practical.

Reasons for Changes and Remarks: In a high performance, high altitude aircraft of this type, it is not practical to maintain temperature gradients within ±5 degrees Fahrenheit of the average.

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70	3.20.1	Air Conditioning
	Requirement:	Paragraph 12.51 - "Maximum ventilating air rate will usually be determined by cabin temperature requirements, but shall be limited to that value which will not permit air movement past seated crew members at more than 200 feet per minute air velocity."
	Deviation:	Air Movement past seated crew members shall be kept to a minimum but may exceed 200 feet per minute air velocity.

Reason for Change and Remarks: Due to the small cockpit size and high flight speeds, the air flow necessary for conditioning the cockpit at altitudes will produce local air velocities in excess of 200 feet per minute.

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71	3.12.9.6	Piping and Fittings
	Requirement:	Paragraph 13.30 - "The piping and connections utilized in the power plant installation shall conform to the types indicated in Figure 13.2."

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

71 (Cont) **Requirement (Cont)** Paragraph 15.66 - "Combustible fluid lines in the engine compartment shall be of stainless steel or flame-resistant hose construction. The hose shall conform to Specification No. AN-H-24."

Deviation: (1) Aluminum alloy fuel lines may be used throughout the fuel system as approved by comment on RFA #77 at YF-102 CTCI Board of 3 March 1954.

(2) Where required, flexible stainless steel hose may be used in lieu of rubber hose.

Reason for Change and Remarks:

(1) In the interest of weight saving, the Contractor recommends the use of aluminum alloy tubing for fuel lines in lieu of stainless steel tubing or hose. The aluminum tubing used is not affected by normal operating temperatures, therefore, adequate structural strength is maintained.

(2) Flexible stainless steel hose is lighter, more durable and will withstand higher pressures than rubber hose.

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72 3.12.9.6 Wall Thickness, Aluminum Alloy

Requirement: Paragraph 13.311 - "Nominal wall thickness of aluminum alloy tubing shall be . . . ."

Deviation: Fuel system tubing minimum wall thickness may be 0.035 for 2.00, 2.50 and 3.00 inch aluminum alloy tubing.

Reason for Change and Remarks: Compliance with the January 1954 version of the AMC Manual 80-1 is requested in order to save appreciable tubing weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

73 3.12.9.6 Wall Thickness, Stainless Steel

Requirement: Paragraph 13.312 "Nominal wall thickness of stainless steel tubing shall not be less than .... etc."

Deviation: The wall thickness of the stainless steel tubing shall be consistent with fluid pressure requirements. In no case shall the proof pressure of the tubing be less than the proof pressure of the equipment installed. In no instance shall the wall thickness of the tubing be less than that required to prevent the collapse of an AND 10060 Style "A" tube bead if clamp-type connectors are used.

Reason for Change and Remarks: Appreciable weight can be saved by selecting tubing in accordance with the above deviation where fabrication permits.

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74 3.12.9.6 Piping and Fittings

Requirement: Paragraph 13.33 - "All fittings such as hose nipples, elbows, flared tube fittings, etc., shall conform to Army-Navy or Air Force standards. The end fittings used with the hose assembly conforming to Drawing AN 6264 shall conform to Drawing AN 792."

Deviation: Fittings shall be of light weight as approved by WADC.

Reason for Change and Remarks: Light weight fittings are used to save weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

75 3.12.9.6 Flexible Connections

Requirement: Paragraph 13.330 - "All flexible hose connections utilizing clamps and nipples shall be in accordance with Drawing AND 10065.

Deviation: Not applicable.

Reason for Change and Remarks: Flexible hoses with clamps and nipples are not used in the power plant installation

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76 3.12.9.5 Vent System

Requirement: Paragraph 13.344 - "All vents and drain lines shall terminate at a point outside the aircraft, passing through resilient grommets in the engine cowling where necessary to prevent chafing, and they shall be so located or formed that drainage cannot be returned to any part of the aircraft structure or enter the exhaust wash from either upstream or downstream. Drain lines shall be easily accessible for draining from the outside of the aircraft."

Deviation: Drains and vents shall be so located that fluids will discharge clear when airplane is in static position.

Reason for Change and Remarks: Location of engine exhaust with respect to the engine drains makes compliance with this requirement impossible.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1**

77 3.12.9.3 Tanks (Fixed) Fuel

Requirement: Paragraph 13.410 - "All combat aircraft including fighter, attack, photographic, cargo (personnel carriers), and bombardment, that have a tactical operating radius of action of fewer than 3,000 nautical miles shall have internal combustible fluid tanks that afford 100% protection against gunfire for the power plant fluid systems. "Means shall be provided for internal and external purging....."

Deviation:
(a) Self-sealing tanks are not provided.
(b) Fuel tanks are pressurized.
(c) Internal and external purging is not required.

Reason for Change and Remarks: (a) Self-sealing tanks reduce fuel capacity and increase weight. (b) High altitude operation requires pressurization to prevent fuel vaporization. Pressure is used for fuel transfer between tanks. (c) Due to the type of airplane, high speed and altitude operation, and low wing tank frontal area, fuel tank purging has been eliminated to save weight.

* * * *

78 3.12.9.3 Availability of Liquid

Requirement: Paragraph 13.415 - "All tanks shall be carefully designed to insure that all of the contained liquid will be useable..."

Deviation: The fuel tanks shall be designed so that there will be a minimum of unuseable fuel.

Reason for Change and Remarks: It is impractical to design the integral tanks and equipment so that all of the fuel will be useable in level flight. The unuseable fuel will be as defined in the detail airplane specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
79	3.12.9.12	Filler Openings

Requirement: Paragraph 13.425 (entire paragraph).

Deviation: Not applicable.

Reason for Change and Remarks: The fuel tanks are filled by single point pressure refueling only. (Reference Convair letter 6-3490 dated 1 July 1952.)

* * * *

80	3.12.9.9	Tank Gage Units

Requirement: Paragraph 13.426 - "Fuel tanks shall be provided with a flange suitable for mounting a gage unit in accordance with Specification No. AN-G-19.

Deviation: The fuel tank gage system shall be in accordance with Contractor's Specification No. 8-02305.

Reason for Change and Remarks: The capacitor-type fuel gage system does not require a flange as per above requirement.

* * * *

81	3.12.8.1.1	Oil Tank Accessibility

Requirement: Paragraph 13.431 -

(a) "It definately shall not be necessary to remove the engine .... prior to removal of any tank."

(b) "It shall be possible to remove any fuel tank .... within 4 hours."

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
81 (Cont)	Deviation:	(a) It shall be permissible to remove the engine prior to the removal of the oil tank.
		(b) Not applicable.

Reason for Change and Remarks: (a) The oil tank is an integral part of the engine. It is impracticable to provide access throughout the fuselage to permit removal of the tank with the engine installed in the airplane.

(b) The fuel tanks are built as an integral part of the wing structure.

* * * *

82	3.5.1	Wing - Description and Components
	Requirement:	Paragraph 13.74 - "Integral fuel tanks which consist of the aircraft structure sealed by means of elastic films, gaskets, caulking compounds, etc., (as differentiated from 'bladder' type cells), shall not be used in Air Force aircraft."
	Deviation:	Integral fuel tanks shall be used.

Reason for Change and Remarks: Considerable previous experience by this Contractor in designing and fabrication of integral fuel tanks, both military and commercial application, have shown them to be satisfactory. Integral tanks provide maximum fuel capacity and minimum weight. Integral fuel tanks shall be fabricated in accordance with Convair Report No. 8-00010, which was approved by AMC letter MCPPAF-6 (WCSF-6) RGA/feb dated 27 May 1954.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1
83	2.2	Applicable Specifications

Requirement: Paragraph 15.15 Power Plant Testing - "One aircraft of each model, as determined by the procuring agency will be subjected to a complete set of ground and flight tests in accordance with AMC Engineering Division Memorandum Report No. TSEPP-506-122."

Deviation: Power Plant testing shall be in accordance with AMC Engineering Division Memorandum Report No. WCNEI-525-460 dated 15 June 1951.

Reason for Change and Remarks: AMC Engineering Division Memorandum Report No. TSEPP-506-122 has been superseded by Memorandum Report No. WCNEI-525-460.

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Deviation	Paragraph	AMC Manual 80-1
84	3.11	Engine Section

Requirement:
Paragraph 15.26 - "Quick-Change Power Plant"
Paragraph 15.270 - "Quick-Change Requirements"
Paragraph 15.28 - "Maintenance - Inspection, Cleaning and Adjustment"
Paragraph 15.29 - "Maintenance - Removal and Replacement"

Deviation: Requirements of above shall be as approved by the YF-102A CTCI Board.

Reason for Change and Remarks: CTCI Board is to determine degree of compliance with above requirements.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

85 3.12.9.3 Tanks (Fixed)

Requirement: Paragraph 15.412 - "Aluminum and aluminum alloy shall be protected from corrosion with corrosion-resistant cartridge conforming to Drawing No. AN-4043."

Deviation: Anti-corrosion cartridge will not be used.

Reason for Change and Remarks: Design of fuel tanks will not accommodate AN cartridge.

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86 3.12.9.3 Tanks (Fixed)

Requirement: Paragraph 15.421 - "The fuel-outlet fitting from all fuel tanks, except external jettison tanks, shall be a booster-pump flange......."

Deviation: Booster-pump flange shall not be required on tanks 1 and 2, left and right.

Reason for Change and Remarks: The booster pump is installed within No. 3 tank. Booster pumps are not used in tanks No. 1 and 2: The No. 3 tank configuration does not permit use of booster pump flanges as an outlet fitting.

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87 3.12.9.3 Tanks (Fixed)

Requirement: Paragraph 15.432 - "Each fuel tank shall be provided with a sump --------."

Deviation: No separate fuel tank sump shall be provided.

CONFIDENTIAL

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

87 (Cont) Reason for Change and Remarks: Since the fuel tank is built integrally with the wing structure, it is not possible to provide a sump without extending into the air stream. Sediment and water can collect in the unusable fuel space, for which there are drain provisions.

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88 3.12.9.5 Vent System

Requirement: Paragraph 15.424 - "One vent connection shall be installed for each fuel tank and located at the high point of the tank when the aircraft is in normal ground position."

Deviation: Conventional type vent system shall not be provided.

Reason for Change and Remarks: Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

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89 3.12.8.1 Lubricating System - Description and Components

3.12.9.13 Refueling Provisions

Requirement: Paragraph 15.425a - "Cap shall conform to AAF Drawing No. 39B5435 with an adapter in accordance with AAF Drawing No. 39B5294 or 44B13830."

Deviation: Fuel and oil caps may be other than that specified, which are no longer acceptable for new installations.

15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

89 (Cont) Reason for Change and Remarks: Inasmuch as pressure refueling only is being provided, a special light-weight bayonet locking cap will be used on the pressure refueling fitting. The oil cap, as approved by WADC, shall be as furnished with the engine in accordance with applicable engine specifications.

* * * *

90 3.12.8.1.1 Oil Tank Accessibility

Requirement: Paragraph 15.431 - "Oil tank shall be changed within 30 minutes."

Deviation: Not applicable.

Reason for Change and Remarks: (Reference deviation requested for Paragraph 13.431) As the tanks are an integral part of the engine, this requirement does not apply with the engine installed. With the engine removed, the oil tank is readily removable.

* * * *

91 3.11.5 Firewalls

Requirement: Paragraph 15.61 - Engine Isolation - "Each engine installation of all aircraft, regardless of the number or relative position of the engines, shall incorporate a stainless steel diaphragm that separates the burner and tailpipe section from accessory section."

Deviation: It shall be permissible to use titanium in lieu of stainless steel for firewalls or shrouding.

15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1(Cont)

91 (Cont) **Reason for Change and Remarks:** Titanium is recognized as a suitable material for firewalls and shrouds where redundant structure is involved. Considerable weight saving can be obtained by using titanium in lieu of stainless steel.

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92 3.11 Engine Section

Requirement: Paragraph 15.62 -

(1) "All fuel tank compartments (considering each group of connected cells as a tank), engine compartments, interior of wing, and interior of fuselage proper shall be isolated from each other with a liquid, gas, and firetight seal."

(2) "All fuel tanks .... shall be fitted with drains at all low points at least 1/2 inch in diameter."

Deviation: (1) A vertical aluminum alloy bulkhead shall be installed forward of the engine compressor inlet. A horizontal aluminum alloy shroud, extending aft from the bulkhead over the wheel bay, shall be installed. A longitudinal vertical firewall shall be provided between the wing fuel tanks and the engine compartment; seal compartment between wing tank and titanium firewall such that fuel will drain out of the compartment and not enter the engine compartment. Fire-resistant shrouds shall surround the fuel shut-off valves. A fire-resistant shroud shall surround the turbine and afterburner from the engine firewall aft. All the above firewall bulkheads and shrouds will be as liquid and gastight as possible.

15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
92 (Cont)	Deviation (Cont)	(2) The fuel tanks shall be fitted with a flush mounted self-locking drain cock which shall have a drain area equal to or greater than a 1/4 inch tube size non-threaded opening.

Reason for Change and Remarks:

(1) The Contractor considers that the above proposed isolation of fuel, engine compartments and fuselage is adequate for this type of airplane. An appreciable weight saving is realized in following this proposal.

(2) Fuel tank drains shall be installed in general accordance with Paragraph 15.422 of AMC Manual 80-1 which requires a 1/4 inch tube size straight thread opening with an approved self-locking drain cock.

* * * *

93 3.12.9.3 Tanks (fixed) - Fuel

Requirement: Paragraph 15.63 - "The inside of the tank compartments should be sprayed with anti-sparking paint such as clear lacquer.

Deviation: Anti-sparking paint shall not be used in conjunction with integral tanks.

Reason for Change and Remarks: The Contractor's past experience shows that anti-sparking paint is of no value.

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94 3.12.9.10 Drainage Provisions

Requirements: Paragraph 15.63 - "Each compartment will be drained by a 1/2 inch hole at the low point in normal flight attitude and

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

94 (Cont) **Requirement:** (Cont) on the ground, using two holes if necessary. These drain holes shall be at least 5 feet away from open exhaust and shall not be upstream or downstream of the exhaust wash."

Deviation: (1) It shall be permissible for the drain holes to be located upstream of the exhaust wash.

(2) Not less than 1/4 inch diameter holes shall be used.

Reason for Change and Remarks:
(1) Due to the configuration of the airplane, it is impracticable to comply with the above requirements. Drain holes will be located upstream of the exhaust wash.

(2) Aerodynamic consideration prevents use of 1/2 inch holes.

* * * *

95 3.11.5 Firewalls

Requirements: Paragraph 15.67 - "Insulating blankets shall be protected from damage during handling by a layer of wire screen on the inside and outside surfaces."

Deviation: Protective wire screenshall not be required on insulating blankets.

Reason for Change and Remarks: The insulating blankets are installed on the inside of the engine mounted shroud; therefore, they are adequately protected from damage during installation and operation of the engine. The insulation is surrounded by inconel foil which is adequate protection during installation of the blankets in the shroud.

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15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
96	3.2.2	Materials
	3.11	Engine Section
	3.11.5	Firewalls

Requirement: Paragraph 15.68 - "All aircraft components, including equipment and structure that might be critically affected by fires occurring in or around the engine, shall be adequately protected by stainless steel shrouding or firewalls."

Deviation: It shall be permissible to use titanium in lieu of stainless steel for firewalls or shrouding.

Reason for Change and Remarks: Titanium is recognized as a suitable material for firewalls and shrouds, also considerable weight saving can be obtained by using titanium in lieu of stainless steel.

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Deviation	Paragraph	
97	3.11.8	Fire Access Door

Requirement: Paragraph 15.692 - "The door shall be located .... aft of the diaphragm."

Deviation: The fire access door shall be located in a convenient position near the bottom of the fuselage and shall allow the extinguishing agent to discharge into the compressor and accessory section. The location shall be as approved by the CTCI Board.

Reason for Change and Remarks: To offer the maximum protection to the fuselage structure in the event of a fire.

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15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
98	3.11	Engine Section

Requirement: Paragraph 16.12

(1) Maximum temperatures, maximum allowable temperature, structure, aluminum alloy (75S-T), 200°F (93.3°C).

(2) The maximum allowable accessory compartment temperature shall be 160°F (71°C).

(3) The maximum allowable generator temperature 185°F (85°C).

Deviation: (1) It shall be permissible for aircraft structural members of magnesium alloy and 75S-T aluminum alloy to be heated to not more than 250°F.

(2) It shall be possible for the accessory compartment temperatures to reach 250°F maximum.

(3) It shall be permissible for the generator to be in a compartment where the temperature may reach 250°F maximum.

Reason for Change and Remarks:

(1) In some instances aircraft components will reach temperatures in excess of 200°F. Allowance for strength reduction, due to high temperatures, will be made.

(2) and (3) Due to the high speed of this airplane and result of aerodynamic heating, the accessory compartment may reach a maximum temperature of 250°F for short periods of time. The generator procurement specification covers this temperature.

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15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
99	3.12.7	Cooling System

Requirement: Paragraph 16.130 - "The design of the cooling system shall be such that the cooling airflow is undirectional."

Deviation: The accessory compartment shall be cooled on the ground by reverse air flow through the compartment into the engine inlet duct.

Reason for Change and Remarks: Until the airplane gains sufficient speed to provide ram air for accessory compartment cooling, air flow through the accessory compartment caused by the negative pressure in the engine inlet ducts is the only practical method of cooling, without severe weight penalties.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
100	3.12.7	Cooling System

Requirement: Paragraph 16.131 - "The cooling air intake for the aft compartment shall be located aft of the engine diaphragm. The intake for the forward compartment cooling system shall not be taken from the engine air induction system duct; this is to prevent flow reversals in the cooling system from supplying heated air to the engine during ground operation.

Deviation: It shall be permissible to utilize air flow from the engine induction system for aft compartment cooling. The forward compartment shall be cooled by air bled off the engine induction system and exhausted at the rear of the airplane.

Reason for Change and Remarks: In order to achieve the lightest, most practical engine installation with the least cooling system drag loss, air is bled off the engine duct for cooling the turbine and afterburner

15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

100 (Cont) Reason for Change and Remarks (Cont)

compartment during flight. On the ground, engine compressor air is ducted into the area through a stainless steel duct and shut-off valve. A check valve is inserted in the system to prevent the hot air from the afterburner compartment from entering the engine duct. The air from the accessory compartment being sucked into the engine during ground operation constitutes such a small percentage of the total engine air flow, no adverse effects are experienced.

* * * *

101 3.12.7 Cooling System

Requirement: Paragraph 16.132 - Compartment Cooling (entire paragraph)

Deviation: Cooling air for the aft engine compartment may be taken from the engine inlet duct and ducted to the aft compartment through fibreglas and aluminum ducts which pass through the accessory compartment.

Reason for Change and Remarks: Fire hazard is not increased by use of nonfire-resistant ducting during in-flight operation. Reverse flow through the nonfire-resistant ducting is prevented by a fire-resistant check valve located adjacent to the engine firewall.

* * * *

102 3.12.8 Lubricating System

Requirement: Section 16.2 - Lubrication Systems

Deviation: This section of the handbook is not applicable to this airplane.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

102 (Cont) Reason for Change and Remarks: The turbo-jet engines specified for this airplane are equipped with an integral oil system and no air frame connections are required, except for installing an additional air-to-oil cooler and venting the accessory gear box.

* * * *

103 3.12.8.1 Lubricating System - Description and Components

Requirement: Paragraph 16.22 - "The lubricating system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. AN-O-8."

Deviation: The lubrication system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. MIL-L-7808.

Reason for Change and Remarks: In accordance with Pratt & Whitney J-57 Information letter No. 43, dated 23 November 1951, the synthetic oil for use in JT3 engines is Pratt & Whitney Specification No. 521, Government Agency Specification No. MIL-L-7808.

* * * *

104 3.12.8.1 Lubricating System - Description and Components

Requirement: Paragraph 16.262 - Oil Cooler Selection (Same as Oil Cooler Selection under 14.24) - "Oil coolers used in production aircraft shall comply with the requirements of Specification No. AN-C-75."

Deviation: Oil coolers shall conform to Contractor's Specification. The cooler shall be of the plate type in lieu of the tubular type construction.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

104 (Cont) Reason for Change and Remarks: To permit use of latest type coolers to save weight. Contractor's specification to be submitted to WADC for approval.

* * * *

105 3.12.8.1 Oil Cooler Installation

Requirement: Paragraph 16.263c -"The area of the outlet from the oil cooler shall be at least equal to the total inlet area of the engine oil pump."

Deviation: The area of the outlet from the oil cooler shall be large enough to prevent exceeding the engine manufacturer's limit on the oil scavenge pump back pressure.

Reason for Change and Remarks: A weight saving can be effected by the use of smaller lines and fittings while keeping within allowable back pressure limits.

* * * *

106 3.12.8.1 Lubricating System - Description and Components

Requirement: Paragraph 16.263e - "Oil cooler mounting (same as Mounting under 14.252)."

Deviation: Not applicable to type of oil cooler design proposed. The oil coolers shall be vibration tested as specified in Paragraph 4.3.2.8.1 of Convair Specification No. 8-02347.

Reason for Change and Remarks: Mounting requirements specified are not applicable to type of coolers being used.

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15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
107	3.12.8.1	Oil Cooler Installation

Requirement: Paragraph 16.263f - "An approved oil temperature regulating valve which includes a surge protection valve conforming to Drawing No. 12N4103, shall be mounted on the oil cooler."

Deviation: No oil temperature regulating valve shall be provided.

Reason for Change and Remarks: Oil temperature control is accomplished by a temperature control valve on the fuel-oil cooler. The engine system can withstand the maximum back pressures created by cold oil flowing through the cooler core, and the plate-type coolers do not require surge or pressure protection.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
108	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.278 - Engine Breather Lines - "This point shall be so located that oil or fumes will not be discharged onto the windshield or flow into the cockpit and shall be visible to the pilot inflight."

Deviation: It is not necessary that the breather line terminate at a point visible to the pilot in flight.

Reason for Change and Remarks: Since the engine breather connection is located approximately 22 feet aft of the pilot, it is not practical to run the breather line forward.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation — Paragraph — AMC Manual 80-1 (Cont)

100 — 3.12.9.1 — Fuel System - Description and Components

Requirement: Paragraph 16.302 - "The entire fuel system shall be designed for the use of Specification No. AN-F-58 fuel. It shall also be capable of satisfactory operation with Specifications No. AN-F-32 and AN-F-48 fuels."

Deviation: Fuel system shall be designed to operate with fuel covered by Specification No. MIL-F-5624A, Grade JP-4 and in emergency on MIL-F-5572 fuel.

Reason for Change and Remarks: The engine specified for this aircraft is designed to operate on JP-4 fuel normally and on MIL-F-5572 in an emergency with certain airplane performance limitations as specified in 3.12.9.1 herein.

* * * *

110 — 3.12.9.1 — Fuel System - Description and Components

Requirement: Paragraph 16.31 - "Design Requirements:"

Deviation: In lieu of the requirements set forth in the HIAD, Section 16.31, the fuel system of the aircraft shall be designed as shown on Convair Drawing No. 8-20304, which shall be submitted to WADC for design approval.

Reason for Change and Remarks: Due to the unconventional fuel system, the requirements of the HIAD do not apply.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

111 3.12.9.5 Vent System - Fuel

Requirement: Paragraph 16.34 - Fuel Tank Vent System (Same as Vent System under 14.33) - "Each fuel tank shall have one vent system with one common outlet."

Deviation: Conventional type vent system shall not be provided.

Reason for Change and Remarks: Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

* * * *

112 3.12.9 Fuel System

Requirement: The fuel system design requirements per 16.32 and the vent system requirements per 16.34, 16.342, and 16.346 of HIAD requires actual airplane tests for installation approval in accordance with Memo Report No. WCNEI-525-460, Section E.

Deviation: The airplane fuel system shall be tested in accordance with the requirements of Convair Report No. ZK-8-029 as approved by USAF and applicable portions of Section E of No. WCNEI-525-460 on a full scale ground system mock-up rig in lieu of the actual airplane.

Reason for Change and Remarks: It is impractical to conduct fuel systems tests on the airplane with this type of installation.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

113 3.12.9.5 Vent System

Requirement: Paragraph 16.345 - "For all other tanks, the internal pressure shall not exceed the external pressure by more than 13.6 inches of water. With fuel having a Reid vapor pressure not greater than 7.0 psi, the maximum allowable pressure in the fuel tank during maximum climb rate shall not exceed 54 inches of water and, when airplane is flying at a fixed altitude after climb, the pressure differential shall decrease to 7 inches of water within 20 minutes."

Deviation: The fuel tank internal pressure shall be sufficient to accomplish the transfer of fuel from tank to tank as required for automatic cg control.

Reason for Change and Remarks: This airplane incorporates a tank pressurization system which eliminates the conventional vent system requirements.

* * * *

114 3.12.9.2 Pumps

Requirement: Paragraph 16.351 - "Booster Pumps"

Deviation: The following shall apply in lieu of the requirements specified in paragraph 16.351. Suitable alternating current centrifugal booster pumps procured to the Contractor Specification shall be provided which may not be mounted directly on the bottom of the tank. Drain lines are not required on alternating current pumps.

Reason for Change and Remarks: Conventional booster pump mounting and installation methods cannot be followed due to the depth and location of the fuel tanks.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

115 3.12.9.1 Controls - Fuel System

Requirement: Paragraph 16.352 - "Fuel valve controls shall be marked red .... "

Deviation: Fuel valve controls need not be marked red, but shall be suitably identified.

Reason for Change and Remarks: The fuel control panel will utilize edge lighting which does not lend itself for special color identification.

* * * *

116 3.12.9.8 Fuel System - Strainer and Filters

Requirement: Paragraph 16.353 - "Fuel strainers in accordance with Drawing Nos AN4108, AN4109 and AN4145 shall be used."

Deviation: Fuel strainers or filters are not required. In lieu thereof, a #8 mesh screen may be installed in the fuel line near the engine to afford protection to the engine pumps.

Reason for Change and Remarks: To preclude excessive fuel pressure drop. Fuel strainers per Drawing No. AN4109 are of insufficient capacity.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

117 3.14.1 Instruments

Requirement: Paragraph 19.0 - "The instruments and instrument boards required shall be installed in accordance with Specification No. AN-I-2."

Deviation: Instruments and instrument boards required shall be installed in accordance with Specification No. MIL-I-5997, except as specified herein.

Reason for Change and Remarks: To establish the specification the Contractor proposed to use.

* * * *

118 3.14.3 Installation - Instruments

Requirement: Paragraph 19.00 - "A minimum clearance of 10 inches shall be provided behind the instrument board to accommodate the instruments and connections when installed."

"Unless otherwise specified, instruments shall be front-mounted; i.e., with the flange of the instrument on the face of the board instead of the rear."

Deviation: A minimum clearance of 6 inches shall be provided behind the instrument board, except at extreme outboard edges in area of "V" type windshield structure. Instruments shall be backmounted.

Reason for Change and Remarks: The configuration of the instrument panel and the space limitations of the cockpit will not allow 10 inches clearance behind the instrument board. The use of sandwich-type panel lighting necessitates the back mounting of instruments.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

119 3.14.3 Installation - Instruments

Requirement: Paragraph 19.04 - "The instruments shall be arranged substantially in accordance with the applicable figure on Drawing No. AD3001."

Deviation: The instruments shall be arranged substantially in accordance with the applicable figure on Drawing No. AD3001, except as approved by Mock-Up Board Meeting on 28 and 29 September 1954.

Reason for Change and Remarks: Space limitations and the prime consideration of the pilot's display of the fire control system.

* * * *

120 3.14.3 Installation - Instruments

Requirement: Paragraph 19.161 - Remote Compass - "Installation shall be made in accordance with applicable specification .... "

"Type J-2 magnetic remote slaved gyro compass Specification No. 21181."

Deviation: Installation of Type J-2 magnetic remote slaved gyro compass shall be in accordance with Specification No. MIL-C-6588.

Reason for Change and Remarks: To comply with latest specification. (Reference Convair letter 6-1851 dated 29 April 1954.)

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
121	3.14.1	Instruments

Requirement: Paragraph 19.19 - "All aircraft with anti-g equipment shall have an accelerometer in accordance with Drawing No. AN 5745."

Deviation: No accelerometer is required.

Reason for Change and Remarks: The accelerometer serves no useful purpose on this airplane.

* * * *

122	3.16.11.2	Signal Assemblies

Requirement: Paragraph 19.46 - The Type C-1 landing gear position indicator, Specification No. 21250, shall be installed in accordance with Specification No. 32300.

Deviation: The AN5839 landing gear position indicator, Specification No. MIL-I-6839 shall be installed in accordance with Specification No. MIL-E-7563 as deviated in this specification.

Reason for Change and Remarks: To specify applicable specifications.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
123	3.14.3	Installation - Instruments

Requirement: Page 19.4, Figure 19-3 - "Installation of directional gyro and gyro horizon."

Deviation: The specified instruments may not be installed in accordance with Figure 19.3.

Reason for Change and Remarks: The Contractor proposes to use small instruments to conserve space. The space limitations of the instrument panel makes it impracticable to comply with Figure 19-3.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
124	3.17.1.1	Control Console

Requirement: Paragraph 20.2 - "Space and mounting provisions shall be made for the original panels to be easily replaced by longer panels so that other panels may be added in case of a change in radio or radar requirements after completion of the airplane design. The extra space provided shall amount to 20% of that required for the installed controls."

Deviation: Twenty percent space of that required for the installed controls shall not be provided.

Reason for Change and Remarks: Due to quantity of equipment installed and to type of aircraft, there is insufficient space available to meet the above requirement.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

125 3.18 Armament

Requirement: Paragraph 21.111 - "This paragraph specifies armament, ground and air test per Specification No. 34014."

Deviation: Armament, ground and air testing per Convair Report ZM-8-109 in lieu of Specification No. 34014.

Reason for Change and Remarks: Specification No. 34014 is not applicable for testing missiles and FFAR.

* * * *

126 3.18.6 Passive Defense

Requirement: Paragraph 21.920 - "Protection shall be provided in all tactical AF aircraft for the crew and vital aircraft components against gunfire in accordance with the following general requirements."

Paragraph 21.921 - Fighter Aircraft - "This paragraph gives specific requirements for fighter aircraft armor.

Deviation: Passive defense shall not be provided.

Reason for Change and Remarks: Unnecessary weight. The low grazing angles of the fuselage forward of the pilot, plus the rugged radome and the mass of radar equipment forward of the pilot are considered to be ample protection.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
127	3.19.1.1	Safety Belt and Shoulder Harness

Requirement: Paragraph 23.110 - "All crew and passenger seats shall be equipped with a belt; aircraft safety, Type B-14."

Paragraph 23.111 - "All crew and passenger seats, except those permanently faced rearward, shall be provided with the belt, safety, shoulder harness, Type B-16."

Deviation: An automatic-opening lap-type safety belt and an adjustable safety shoulder harness, as specified in Appendix 1-A, shall be installed on each seat.

Reason for Change and Remarks: WADC specified above equipment for this airplane.

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128	3.16.7	Controls - Electrical

Requirement: Paragraph 23.14 - "Heated clothing rheostat, Type Q-1B, in accordance with Specification No. 94-32357, shall be installed at each crew station in all bombers and large aircraft of 15,000 pounds gross weight or larger .... "

Deviation: Heated clothing rheostat shall not be required. A rheostat and receptacle as approved by WADC shall be provided for electrical heating of partial pressure suit face plate.

Reason for Change and Remarks: Heated clothing not required in that the cockpit is air conditioned.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
129	3.19.2	Miscellaneous Equipment

Requirement: Paragraph 23.26 - "All aircraft shall be equipped with a baggage and tool locker or compartment appropriate to the crew and intended mission of the aircraft, etc."

Deviation: Baggage compartment or tool compartment shall not be required.

Reason for Change and Remarks: F-102A Mock-Up Board decision at nose section inspection held at Convair on 28 - 29 July 1954. RFA #66.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
130	3.19.1	Accommodations for Personnel - Smoking Facilities

Requirement: Paragraph 23.28 - Compartments where smoking is permitted shall be equipped with ash trays of the self-contained type which are completely removable, and where practicable, with electric lighters. All other compartments shall be placarded against smoking.

Deviation: No ash tray or electric lighter shall be provided. Compartment shall not be placarded against smoking.

Reason for Change and Remarks: F-102A approval by Nose Section Mock-Up Board Inspection on 28 - 29 July 1954. (Reference RFA #66) To maintain design identical to F-102A airplanes.

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15 OCT 1954

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
131	3.19.2.2	Map and Data Case

Requirement: Paragraph 23.230 - Data Case - "To provide an aircraft data case, Dwg, No. 36G2873, shall be installed in all aircraft.

Paragraph 23.233 - Flight Report Holder "All aircraft shall be equipped with a flight report holder, Type A-2, in accordance with Drawing 0161366."

Paragraph 23.234 - Map Case - "Aircraft having a cruising range over 600 miles shall be equipped with a map case at least 9 x 12 x 4 inches.

Deviation: A combination flight report holder, data and map case shall be provided, which dimensions shall be 9 x 12 x 3.75 inches.

Reason for Change and Remarks: Relatively short flight duration and large amount of electronic navigational aids installed, obviate need for separate flight report holder map and data cases. The combination case will be the size specified in Paragraph 23.234 except for thickness.

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15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
132	3.2.2 3.11.5	Materials Firewalls

Requirement: Paragraph 24.00 - "Aircraft designers shall utilize materials and processes approved for USAF use, which are listed not only in the USAF Index of Specifications, and Bulletins Approved for USAF Procurement, but also in USAF Bulletin No. 23."

Deviation: (A) Components of the airframe as illustrated by the list below may be manufactured of metal honeycomb construction, metal-to-metal bonded construction, or glass fiber plastic honeycomb construction providing process specifications controlling the complete construction and inspection of the components are submitted for USAF approval and providing each primary structural application is submitted for USAF approval.

1. Wing Tip
2. Fin Tip
3. Rudder
4. Nose Wheel Door
5. Elevon Trailing Edge
6. RAT Door
7. Engine Intake Duct
8. Cockpit Side Panels
9. Access Doors
10. Wing Fences
11. Upper Access door – Intermediate electrnics comp.
12. Vertical Beam - Nose radar comp.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
132 (Cont)	3.11.5	Firewalls (Cont) (B) The use of Inconel W alloy is permitted, subject to specific approval of each application by WADC. (C) Structural and non-structural applications of titanium and titanium alloys in accordance with AMS-4900, AMS-4901, AMS-4908, AMS-4921, AMS-4925, USAF Specification Bulletin No. 108A and Convair Specification No. 0-01008 shall be permitted subject to individual application approval by WADC. Other titanium alloys may be used as WADC approval is granted. (D) The use of 24S bare aluminum alloy, sheet and extrusion, solution heat treated and artificially aged shall be permitted and the design allowables shall be based on the recommended physical properties of ANC-5. and Convair Report ZS-205 revised 25 May 1954 titled "Mechanical Properties of Artificially Aged 24S Material."

Reason for Change and Remarks: (A) Permits higher production with lower cost and decreased weight.

(B) Inconel W is approved by AMC letter MCPPAF-6 (WCSF-6) RGA/met dated 6 November 1953.

(C) Due to optimum strength-weight ratio, considerable weight savings are made possible.

(D) The use of bare 24S aluminum alloys provides higher physical properties and a resulting weight saving. Verbal Approval was given by Materials Lab.

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CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

133 3.2.2. Materials

Requirement: Paragraph 24.122 - "Arc-welding electrodes conforming to Spec. AN-E-9. . . . . are preferred. . . . ."

Deviation: In addition, heat treatable welding electrodes as specified in Convair Specification 0-01004 may be used for structural application providing the design allowables of Convair report ZS-194 "Heat Treatable Welds in Steel Plate" are used.

Reason for Change and Remarks: To provide higher strength welds. Specs 0-01004 and ZS-194 were approved by AMC letters MCPPAF-6 (WCSF-6) RGA/met dated 23 September 1953 and MCPPAF-6 (WCSF-6) RGA/met dated 23 December 1953.

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134 3.2.2 Materials

Requirement: Paragraph 24.123 - "The joints shall be designed, fabricated, inspected and accepted in accordance with Spec AN-W-30. . . . ."

Deviation: Spot welding of commercially pure titanium sheet shall be permitted in accordance with Convair Spec. 0-05003.

Reason for Change and Remarks: Convair Spec 0-05003 was approved by AMC letter MCPPAF-6 (WCSF-6) RGA/feb dated 12 July 1954.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
135	3.4	Structural Design Criteria

Requirement: Paragraph 25.1 - "Demonstration flights of aircraft shall be conducted in accordance with Specification No. R-1803-11."

Deviation: The requirements shall be as outlined in Contractor's Report No. ZU-8-021 "TF-102A Structural Integrity Flight Demonstration" which shall be subject to WADC approval. It shall be used in lieu of Specification No. R-1803-11 dated August 1, 1947.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range and purpose of the aircraft.

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9.8 '54

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1, Drawing AD1
136	3.19.2.1	Instrument Panel

Requirement: Sheet 3 of 3 - Landing gear position indicators shown immediately above Landing Gear Control Handle.

Deviation: Landing gear position indicators shall be located on the left side of the student's instrument panel.

Reason for Change and Remarks: (a) Location in agreement with ANA Bulletin #386.

(b) Location approved by F-102A Mock-Up Board of 28-29 July 1954. Ref RFA #37. To maintain design identical to F-102A airplanes.

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Deviation	Paragraph	AMC Manual 80-1, Drawing AD1
137	3.16.8.2	Interior Lights

Requirement: Sheet 3 of 3 - Lighting switches to be in RH console.

Deviation: Lighting switches shall be located on utility switch panel located below each instrument panel.

Reason for Change and Remarks: Location approved by F-102A Mock-Up Board of 28-29 July 1954, Ref RFA #14. To maintain design identical to F-102A airplanes.

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Deviation	Paragraph	AMC Manual 80-1, Drawing AD1
138	3.10.4.2	Pilot Assist System
	3.17.1.1	Control Panels

Requirement: Sheet 3 of 3 - Lighting, De-icing and Pitot heat controls shown on RH console.

CONFIDENTIAL

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1, Drawing AD1 (Cont)
138 (Cont)	3.10.4.2	Pilot Assist System (Cont)
	3.17.1.1	Controls Panels (Cont)
	Deviation:	Data link and AFCS panels shall be located in center console in lieu of equipment shown above.

Reason for Change and Remarks: To maintain same relation to student as on F-102A.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-B-2a, dated 20 August 1947 - Brake System: Aircraft, Design of
139	3.8.2.2	Brakes

Requirement: Paragraph C-1: "This capacity shall normally consist of 100 stops at 10 feet per second per second deceleration at the design gross weight condition of the airplane or 0.9 times the maximum alternate weight, whichever is larger."

Deviation: The brakes shall be the same as those used on the F-102A airplane.

Reason for Change and Remarks: To use existing F-102A components wherever practicable.

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140	3.8.2.2	Brakes

Requirement: Paragraph D-4b and D-4e (4)a - Parking Locks

Deviation: Parking locks are not required.

Reason for Change and Remarks: F-102A Cockpit Mock-Up Board agreed that parking brakes were not required for F-102A. To maintain design identical to F-102A airplanes.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification AN-B-4b (1) dated 7 September 1949, Bearings; Anti-Friction Air-Frame Ball
141	3.2.11.1	Bearings
	Requirement:	Paragraph D-1b(1)- " --- the closure shall be a composition contact seal which will operate satisfactorily at conditions specified in section F.
	Deviation:	Anti-friction bearings without fixed seals may be used in the secondary controls systems.

Reason for Change and Remarks: To save weight and simplify design, bearings of the Fafnir B500 series (unshielded) may be used. Removable stainless steel shields will be added at each application for retaining the lubricant.

* * * *

Deviation	Paragraph	
142	3.2.11.1	Bearings
	Requirement:	Paragraph D-6. Lubrication - "The bearings shall be packed with grease conforming to Specification AN-G-25.."
	Deviation:	Anti-friction bearings used in high temperature areas shall be packed with high temperature lubricant, Dow-Corning DC-44 or equivalent.

Reason for Change and Remarks: To provide high temperature lubricant in bearings required in the high temperature areas. (Deviation approved by AMC letter of 28 August 1953.)

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15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-J-5 (2), dated 26 November 1947 - Jack Pads; Design and Installation of (For Aircraft)
143	3.22.2	Jacking Provisions

Requirement: Paragraph E-1a (2) - "Aircraft having a gross weight between 19,000 and 100,000 pounds shall be provided with four jack pads on the wings or nacelles (two on each side)."

Deviation: Two jack pads shall be installed on the wing (one on each side).

Reason for Change and Remarks: Due to the short span of the wing it is not practical to use two jack pads on each side.

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Deviation	Paragraph	
144	3.22.2	Jacking Provisions

Requirement: Paragraph E-1c (2) - "Aircraft having a gross weight of 20,000 pounds or less shall be provided with one jack pad and aircraft having a gross weight of over 20,000 pounds shall be provided with two jack pads....."

Deviation: One jack pad only shall be required on the fuselage.

Reason for Change and Remarks: The configuration of the airplane is such that a second jack pad on the nose section would interfere with the operation of the nose gear and nose gear door. The airplane mock-up (TF-102A) was presented and approved with the single jack point on the fuselage.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AN-I-21A (2), dated 2 May 1947, Interchangeability and Replaceability of Component Parts for Airplanes.
145	3.2.5	Interchangeability and Replaceability
	Requirement:	Specification No. AN-I-21A (2).
	Deviation:	The component parts of the airplane will be interchangeable or replaceable, as the case may be, as specified in Appendix IIIA which is in general accordance with Specification No. AN-I-21.

Reason for Change and Remarks: To establish the degree of interchangeability and replaceability. To maintain same interchangeability and replaceability requirements for parts common to F-102A airplanes and TF-102A airplanes.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. R-1800-E (5), dated 28 May 1945 - Aircraft, General Specification for
146	3.2.11.1	Bearings

Requirement: Paragraph D-3 - ".....Whenever AAF Standard utility parts cannot be used, the special parts shall be so fabricated that they will not be dimensionally interchangeable with AAF Standard utility parts and their appearance shall be readily distinguishable."

Deviation: Certain anti-friction bearings will be interchangeable dimensionally with other standard anti-friction bearings but will utilize high temperature lubricants and will be marked to indicate the high temperature usage.

Reason for Change and Remarks: Anti-friction bearings utilizing high temperature lubricants required in high temperature areas. (Deviation approved by AMC Ltr of 28 August 1953).

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147	4.1	Sampling Inspection and Test

Requirement: Paragraph D-15 - Magnetic Inspection: At least the following primary structural assemblies, if fabricated of ferrous materials, shall be magnetically inspected in accordance with Specification AN-I-32: etc.

Paragraph D-15a - Bolts: Bolts to be used in primary and other important assemblies and locations shall be magnetically inspected. The contractor shall furnish a list of these assemblies showing the location of all important bolts identified by AN part number if it is a standard bolt, and by the Contractor's part number if it is a special bolt.

15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. R-1800-E (5) (Cont)
147 (Cont)	4.1	Sampling Inspection and Test (Cont)
	Deviation:	Not applicable. Magnetic inspection shall be in accordand with Specification No. MIL-I-6868.

Reason for Change and Remarks: These requirements have been restated in AN-I-39, MIL-I-6870 and MIL-I-6870A on succeeding dates and the existence of the old requirements are considered redundant and confusing. (Ref Convair Ltr 6-795 dated 26 Feb 1954).

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15 OCT 1954

~~CONFIDENTIAL~~

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B, dated 1 June 1948 - Stability and Control Characteristics for Airplanes
148	3.3.2.1	Stability and Control
	Requirement:	Paragraph 2.4 - "Vs indicated stalling speed, corrected for instrument and position error, at the gross weight corresponding to the specified condition."
	Deviation:	Vs shall be defined as that speed attainable with $C_L = 0.75$, corrected for instrument and position error, at the gross weight corresponding to the specified condition.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

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Deviation	Paragraph	AAF Specification No. 1815B, dated 1 June 1948 - Stability and Control Characteristics for Airplanes
149	3.3.2.1	Stability and Control
	Requirement:	Paragraph 4.1 - "Dynamic Longitudinal Stability - The short period dynamic oscilliation of normal acceleration produced by moving and quickly releasing the elevator control shall be damped to 1/10 amplitude in one cycle."
	Deviation:	The specified number of cycles to damp may be exceeded provided that the oscillations are definitely stable and the degree of damping is satisfactory to WADC. If a device is used to provide the desired damping, it shall be required that no dangerous oscillations can occur under any circumstances without such damping device.

15 OCT 1954

~~CONFIDENTIAL~~

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
149 (Cont)	3.3.2.1	Stability and Control (Cont)

Reason for Change and Remarks: As already demonstrated on the YF-102 in flight, it is not necessary to meet the specified damping from the flight safety standpoint. The pitch damper will normally be operative.

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Deviation	Paragraph	AAF Specification No. 1815B (Cont)
150	3.3.2.1	Stability and Control

Requirement: Paragraph 4.2.1 - "The airplane shall posses positive static stick-fixed and stick-free longitudinal stability at all normal service loadings when flying with constant throttle setting under the conditions of Table II .... if the curve of the variation of stick force with air speed below the trim speed does not cross the zero force axis and a pull force is required to reduce the speed from trim."

Deviation: (a) Elevator-Fixed Static Stability-Applicable, except that at a Mach number above 0.85 with the airplane trimmed at a Mach Number of 0.85, the variation of elevator deflection with Mach number may be negative, provided it is mild and not seriously objectionable to the pilot.

(b) Elevator-Free Static Stability - When trimmed under the conditions specified in Table II the variation of longitudinal control force with speed shall be a smooth curve with a stable gradient over a speed range of 50 knots (true speed) above and below trim. If a reversal in slope occurs above or below this speed range the change of control force with speed shall be mild and not seriously objectionable to the pilot.

15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
150 (Cont)	3.3.2.1	Stability and Control (Cont)

Reason for Change and Remarks: (a) A mild instability of elevator angle will occur at transonic speeds which is caused by an aft movement of the center of pressure with constant or decreasing control effectiveness. This effect is considered not to be a hinderance to the flying qualities because the variation of longitudinal control force with speed shall be a smooth stable curve.

(b) The original specification requirements are not applicable to an airplane flying through the transonic speed range with a power control system.

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151 3.3.2.1 Stability and Control

Requirement: Paragraph 4.3.2 - "When the airplane is trimmed at any permissible speed, it shall be possible by use of the elevator alone to develop, at the trim speed, the maximum positive or negative lift coefficient or positive or negative limit load factor, whichever is reached first. This requirement shall apply to all of the configurations listed in Paragraph 2.2 with the exception of configuration WO."

Deviation: Applicable, except as limited by angle of attack corresponding to a $C_L = 0.75$ at stall speed, maximum available elevator deflection or maximum limit load factor. The stalling speed used for performance estimates or guarantees (if any) shall be consistent with this definition.

Reason for Change and Remarks: An arbitrary angle of attack has to be selected and elevator control power be made consistent with an optimum power control system in order that undue weight penalties do not occur.

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CONFIDENTIAL

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
152	3.3.2.1	Stability and Control
	Requirement:	Paragraph 5.1.1 - "The damping of the lateral-directional oscillation with controls fixed and free shall be positive and shall be such that the time to damp to one-half amplitude and the period shall fall within the satisfactory area of the chart given in Figure 1."
	Deviation:	Artificial damping devices may be used to meet the requirements of R-1815B.
	Reason for Change and Remarks:	Artificial damping devices will be required to meet the requirements of R-1815B.

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Deviation	Paragraph	AAF Specification No. 1815B (Cont)
153	3.3.2.1	Stability and Control
	Requirement:	Paragraph 6.3.4 - "In rolls from straight or turning flight under the specified conditions at 10,000 feet altitude, with the rudder held fixed in the position required for steady flight prior to the roll, the ailerons or other lateral control device shall be sufficiently powerful to produce the peak rolling rates corresponding to the values given in Table V."
	Deviation:	Available roll rates shall be subject to approval by WADC.
	Reason for Change and Remarks:	Additional investigations are required to establish the roll rates.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
154	3.3.2.1	Stability and Control

Requirement: Paragraph 7.1.1 - "The complete stall is considered to be the condition associated with breakdown of the airflow over the wing, and occurring immediately after the overall trimmed lift coefficient of the airplane reaches its maximum value, except that this maximum shall not be set by limitations of available longitudinal control power. The complete stall is generally characterized by the following changes in the flying characteristics of the airplane:

(a) In straight flight, the airplane experiences one or more of the following: An abrupt downward pitching of the nose, or an abrupt dropping of the wing and the air speed reaches a minimum.

(b) In turning flight, the normal acceleration decreases markedly or the airplane rolls markedly."

Deviation: For purposes of stalling characteristics demonstration only, the stall shall be considered to be identified by full up elevator deflection.

Reason for Change and Remarks: There is no definite stall point as on conventional aircraft.

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Deviation	Paragraph	AAF Specification No. 1815B (Cont)
155	3.3.2.1	Stability and Control

Requirement: Paragraph 8.1.1 - "The control system should be capable of moving the control surfaces at rates up to 35

15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
155 (Cont)	3.3.2.1	Stability and Control (Cont)

degrees per second for Class I and II airplanes and 50 degrees per second for Class III and IV airplanes under any aerodynamic hinge moments encountered."

Deviation: The ability of the airplane to perform the maneuvers expected of it shall not be limited significantly by the rates of the control surface deflection. In order that this condition be fulfilled, it is required that the rates of control surface displacement, under any flight condition, shall reach and remain within +10% of the final (short period) value in a time not more than 10% greater than the time associated with an assumed instantaneous control surface displacement of the same given value.

Reason for Change and Remarks: This deviation is consistent with design and weight penalties.

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156 3.3.2.1 Stability and Control

Requirement: Paragraph 8.1.2 - "When the cockpit control is moved at its maximum rate to a given deflection, the control surface shall reach its corresponding deflection with a time lag not greater than 0.05 second."

Deviation: The equivalent first order time constant for the power control system shall be no greater than 0.1 sec.

Reason for Change and Remarks: Lags not compatible with specification requirements for the slower surface rates will be sufficiently small that the control characteristics will be satisfactory.

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~~CONFIDENTIAL~~

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation1	Paragraph	AAF Specification No. 1815B (Cont)
157	3.10.1	Primary Flight Control System

Requirement: Paragraph 8.1.3 - "The dead spots in the controls should not exceed ±0.1 inch motion of the pilot's cockpit controls.

Deviation: The dead spots in the controls shall not exceed ±0.2 inch motion of the pilot's cockpit controls.

Reason for Change and Remarks: The function design requirements of the airplane will not permit a simplified routing of the system to meet this requirement.

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Deviation1	Paragraph	AAF Specification No. 1815B (Cont)
158	3.3.2.1	Stability and Control

Requirement: Paragraph 8.4.1 - "For airplanes having two or more completely independent equivalent power control systems, the requirements of Paragraph 8.3.1 shall be met during the period of transfer from one system to another. Paragraphs 8.3.2, 8.3.3, and 8.3.4 do not apply to these airplanes."

Deviation: Applicable except that each system shall be capable of providing approximately half of the design hinge moment. Both systems shall be in operation under normal conditions.

Reason for Change and Remarks: To enable use of independent dual systems.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1816, dated 15 June 1945 - Spinning Requirements for Airplanes -
159	3.3	Aerodynamics

Requirement: Paragraph B-1 - "This specification covers the spinning requirements of airplanes."

Deviation: The requirements of this specification shall be applicable to this airplane if it can be shown that spins may be encountered.

Reason for Change and Remarks: Available data indicate that the airplane may be spinproof.

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Deviation	Paragraph	
160	3.3	Aerodynamics

Requirement: Paragraph D-3a - References Paragraph D-2a which specified "a one-hour spin test flight."

Deviation: One-half hour spin test flight.

Reason for Change and Remarks: To conform with airplane endurance and the intent of the specification.

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15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AF Specification No. 40149, dated 2 September 1947, Check List; Air Crew Operation
161	3.19.2.3	Check List

Requirement: Paragraph E-1b(2)a - "The material with which the content is printed on the plate shall be a phosphorescent substance having a peak brightness of at least 100 microlamberts when measured in accordance with provisions of Specification No. AN-L-1. It shall have a phosphorescent value of at least 15% of its peak brightness 30 seconds after removal from the source of excitation and at least 3% of its peak brightness 2 minutes after its removal from the source of excitation."

Deviation: The check-off list shall be illuminated according to Specification No. MIL-P-7788.

Reason for Change and Remarks: For uniformity and ease of servicing, all lighting in the cockpit is red light. There is no ultraviolet light provision in the cockpit.

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15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C dated 15 December 1947, Anti-Icing Equipment for Aircraft (heated Surface Type,) General Specifications for
162	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-1e. - "Antenna masts, pitot tubes, radar vanes and airfoils, and other structures of similar nature which project into the air stream so as to be exposed to and adversely affected by ice accumulations shall be protected by the anti-icing system."

Deviation: Applicable, except that the radome will be protected by a freezing point suppressant liquid spray.

Reason for Change and Remarks: Freezing point suppressant liquid spray system recommended by WADC Components System Laboratory.

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163	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-2a. - "The anti-icing system shall provide protection against an icing condition ......and wherein the size of the water droplets is not less than 15 microns in diameter."

Deviation: The anti-icing system shall provide protection against an icing condition...... and wherein, the mean effective cloud droplet diameter is not less than 15 microns.

Reason for Change and Remarks: The accepted method of designing for the protection of aircraft against ice is based on a mean effective cloud droplet diameter rather than a minimum diameter.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
164	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-3. - "No aircraft structural members shall be heated to more than 200°F."

Deviation: It shall be permissible for aircraft structural members to be heated to more than 200°F.

Reason for Change and Remarks: Allowance for strength reduction due to high temperatures will be made. To maintain the design identical to F-102A airplane.

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Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
165	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-5. - "The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than five degrees Fahrenheit after two hours of operation."

Deviation: The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than 5°F during the length of time that the anti-icing system may be in operation.

Reason for Change and Remarks: The flight time under icing conditions will be much less than two hours.

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15 OCT 1954

~~CONFIDENTIAL~~

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
166	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-8a. - "The anti-icing system shall be capable of distributing heat to remove frost and ice from the wing and empennage surfaces when the airplane is at rest on the ground at all ambient temperatures down to -65°F.

Deviation: Not applicable.

Reason for Change and Remarks: Wing and empennage surfaces have anti-icing space and structural provisions only. To maintain the design identical to F-102A airplane.

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Deviation	Paragraph	
167	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-9. -"The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, dated 9 January 1946."

Deviation: The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, Dated 9 January 1946, or other authoritative literature.

Reason for Change and Remarks: There is authoritative literature which is more up to date and more realistic with respect to predicting water catch, water load profiles, and heat requirements. To maintain the design identical to F-102A airplane.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Spec. No. MIL-I-5072, dated 6 April 1949 - Instrument Systems; Pitot Static Tube Operated, Installation of
168	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.6 - Connecting Lines - "The pitot and static pressure lines connecting the pitot and static tubes to the instruments shall conform to Spec. WW-T-787, anodized in accordance with Spec. AN-QQ-A-696, and shall be 1/4 inch outside diameter and 0.032 inch wall thickness."

Deviation: Pitot and static pressure lines in the radome area shall be 1/4 inch outside diameter and 0.035 inch wall thickness and shall be nylon, (Polymer Corp #FM 10,000 or equiv.) as approved by WADC, prior to installation.

Reason for Change and Remarks: To eliminate electronic radar interference by the installation of suitable nonmetallic lines in the radome area. To maintain the design identical to F-102A airplane.

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Deviation	Paragraph	
169	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.7 - Connecting Fittings - "Connecting fittings used throughout the installation of pitot-static instrument systems shall conform to Air Force-Navy Aeronautical Standards."

Deviation: Quick disconnect type fittings may be installed in lines to facilitate removal of quick detachable radome.

Reason for Change and Remarks: To comply with requirements of Hughes Aircraft Corporation specification covering fire control system of quick disconnect radome.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Spec. MIL-I-5072 (Cont)
170	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.15 - "When specified, an alternate source of static pressure for each pitot-static tube shall be provided by installing a static pressure selector valve conforming to Drawing AN5831 . . ."

Deviation: An alternate source of static pressure shall not be required. To maintain the design identical to F-102A airplane.

Reason for Change and Remarks: It is anticipated that special means with respect to static sources will have to be taken to meet the requirements for instrumentation and fire control equipment. The Contractor proposes to satisfy these particular requirements.

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Deviation	Paragraph	Military Spec. MIL-I-5072 (Cont)
171	3.14.3	Instrument Installation

Requirement: Paragraph 4.3.3.4.3 - "The air speed and altitude indication errors due to the location of the pitot-static tube, corrected to standard sea level conditions, shall not exceed the limits specified in Table I when tested in flight."

Deviation: In the transonic and supersonic speeds the Contractor will attempt to obtain the maximum accuracy possible using latest techniques.

Reason for Change and Remarks: The available equipment is not expected to yield the specified accuracies at transonic speeds.

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15 OCT 1954

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CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-W-5088, dated 14 March 1951 Wiring; Aircraft, Installation of
172	3.16.5	Wiring

Requirement: Paragraph 3.2.2.1 - "Insulating tubing for temperatures less than 93.3°C (200°F) shall conform to Specification JAN-I-631."

Deviation: It shall be permissible to use nylon insulating tubing. Where temperature of 93.3°C (200°F) is exceeded only during high speed operation, high temperature sleeving shall not be required.

Reason for Change and Remarks: Nylon insulating tubing is more suitable for use on this airplane since it will withstand Pratt and Whitney Engine Oil (Specification 521A) which is known to be detrimental to vinyl tubing, and has much better abrasive characteristics. Short duration of high temperature operation does not warrant the additional weight and cost. High temperature insulating tubing will be used wherever there is any possibility of damage due to excessive temperature.

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Deviation	Paragraph	
173	3.16.5	Wiring

Requirement: Paragraph 3.5.1.1 - For applications under 600V, cables shall be in accordance with Spec MIL-W-5086, MIL-W-7072, and MIL-C-7078. When specified by the procuring service cables in accordance with MIL-W-5274 (USAF) shall be used.

Deviation: (1) In addition to the above, cable in accordance with MIL-W-5274 (USAF) may be used for wire sizes AN-12 and smaller. For wire sizes AN-10 and larger cable in accordance with CVAC Spec. ZM-340-012 may be used.

CONFIDENTIAL

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph MIL Spec MIL-W-5088 (Cont)

173 (Cont) 3.16.5 Wiring (Cont)

(2) Special cable may be used subject to the approval of the procuring agency.

Reason for Change and Remarks: (1) Use of MIL-W-5274 (USAF) cable was requested by WADC - Cable in accordance with ZM-340-012 meets the requirements of MIL-W-5274 (USAF) for larger sizes not specified therein.

(2) To permit this contractor to use cable best suited for particular application.

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174 3.16.5 Wiring

Requirement: Paragraph 3.5.1.3 - "In areas where the cable temperature exceeds 100°C (212°F), cables specifically approved for high temperature use shall be installed."

Deviation: Where a temperature of 100°C (212°F) is exceeded only during high speed operation, high temperature wire shall not be required. High temperature wire shall be used where temperatures exceed 250°F for periods of 5 minutes or longer.

Reason for Change and Remarks: Short duration of high temperature operation does not warrant the additional weight and cost. High temperature wire will be used wherever there is any possibility of damage due to excessive temperature.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
175	3.16.5	Wiring

Requirement: Paragraph 3.5.1.4 - Coaxial cables suitable for the application shall conform to Specification JAN-C-17.

Deviation: Coaxial cable need not conform to JAN-C-17 but shall be approved by the procuring agency.

Reason for Change and Remarks: To use the coaxial cable best suited to the application and to take advantage of the reduced weight of newer coaxial cable.

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176	3.17 3.16.5	Electronics Wiring

Requirement: Paragraph 3.5.2.3 "When approved by the procuring service, cable size AN-22 may be used, provided that precautions are taken to prevent failure due to vibration and handling.

Deviation: Cable size AN-22 may be used for all inter-unit and inter-area electrical and electronic wiring where current carrying capacity and strength do not dictate use of larger conductor sizes.

Reason for Change and Remarks: Due to the large number of wires required and limited space available in the aircraft, a substantial improvement in size and weight of harness may be realized by substitution of the AN-22 cable for larger cables wherever possible.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph MIL Spec MIL-W-5088 (Cont)

177 3.16.5 Wiring

Requirement: Paragraph 3.6.1.1 - Exposed Junctions - Exposed junctions and buses shall be protected with insulating materials. Junctions and buses located within enclosed areas containing only electrical and electronic equipment are not considered exposed.

Deviation: Covers over electrical and radio equipment (Terminal strips etc.) shall not be required in locations where structure provides sufficient protection.

Reason for Change and Remarks: Covers not considered required where structure provides sufficient protection. This will result in a considerable weight saving in the airplane.

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178 2.16.5 Wiring

Requirement: Paragraph 3.6.6.1 - "Connectors in engine nacelles, areas of high vibration (excluding those on shock-mounted equipment) and in locations not readily available for inspection in flight shall have the coupling nut safety-wired to prevent opening of the connector due to vibration.

Deviation: "UG" type connectors in particular, and other bayonet type connectors with no threaded coupling nut, subject to approval of the procuring service need not be safety wired.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** MIL-Spec MIL-W-5088 (Cont)

178 Reason for Change and Remarks: Bayonet type connectors have a locking notch and once properly connected are not subject to opening due to vibration. These connectors are designed to the requirements of MIL-C-3608 which does not provide for safety wiring.

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179 3.16.10.2 Electrical Connectors

Requirement: Paragraph 3.6.6.4 - "Connectors for general aircraft wiring shall be in accordance with Specification No. MIL-C-5015."

Deviation: (1) Plugs suitable for potting designed in general accordance with BuAer drawing 54A3A225 (except that resilient inserts shall be specified) and receptacles meeting the same requirements except designed in accordance with AN-3100 or AN-3102 may be used in areas where the ambient temperature does not exceed 225°F.

(2) A minimum number of other nonapproved type connectors may be used where necessary, subject to the approval of the Procuring Agency.

Reason for Change and Remarks: (1) To insure a more environment free installation and to reduce weight.

(2) To permit the contractor to make use of the best possible design from servicing and weight standpoint. To maintain design identical to F-102A airplane.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **MIL-Spec MIL-W-5088** (Cont)

180 3.16.5 Wiring

Requirement: Paragraph 3.6.6.4.1 Transparent insulating tubing or other approved material shall be placed over each cable terminal connection in both plugs and receptacles.

Deviation: Insulating tubing shall not be required when either "potted" or "E" type connectors are used.

Reason for Change and Remarks: This requirement is not applicable when potted or "E" type connectors are used.

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181 3.16.5 Wiring

Requirment: Paragraph 3.6.6.4.2 Adapters 1 "Open wiring attached to connectors shall be supported by AN3057 Adapters and AN3420 Bushings or to an assembly consisting of a maximum length of six inches of insulating tubing, a set of approved ferrules, etc."

Deviation: (1) It shall be permissible to use Coast Pro-Seal Mfg. Div. No. E.P. 601-P compound or Minn. Mining No. E.C. No. 1120 P.C. compound as a "fill" and support in lieu of clamps or adapters where the Contractor deems it practicable.

(2) Where adapters are used it shall be permissible to use bushings designed to AN3420A except that the material shall be suitable for use in areas subject to pollution by engine oil.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** MIL-Spec MIL-W-5088 (Cont)

181 (Cont) 3.16.5 Wiring (Cont)

Reason for Change and Remarks: (1) Potting compound provides a more suitable method of sealing connectors against moisture and foreign particles. Also, it is a large weight savings.

(2) The material specified for AN3420A bushings is not suitable for use where it may be subjected to contamination by MIL-L-7808, P and W engine oil No. 521A.

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182 3.16.5 Wiring

Requirement: Paragraph 3.6.6.4.3 - "Special purpose connectors - Where installation conditions require pressurized sealed, vibration-resistant, flame-barrier, fireproof, or waterproof connectors, suitable special purpose connectors in accordance with Specification No. MIL-C-5015 shall be used."

Deviation: A minimum number of nonapproved type connectors may be used where necessary, subject to the approval of the procuring agency.

Reason for Change and Remarks: This will permit the Contractor to make the best possible design from servicing standpoint. To maintain design identical to F-102A airplane.

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183 3.16.10.2 Electrical Connectors

Requirement: Paragraph 3.6.6.5 - Connectors for coaxial cables shall be in accordance with Spec JAN-C-71.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph MIL-Spec MIL-W-5088 (Cont)

183 Deviation: Connectors for coaxial cable shall be suitable for use with the coaxial cable used and shall be approved by the procuring service.

Reason for Change and Remarks: Connectors in accordance with Spec JAN-C-71 are for use with coaxial cable in accordance with JAN-C-17. Since other types of coaxial cable will be used suitable connectors must be permitted.

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184 3.16.5 Wiring

Requirement: Paragraph 3.6.7 - Splices shall be covered with transparent insulating tubing extending at least 1/2 inch over each end, providing it is a snug fit, and it will be secured in place. Splices shall be staggered to prevent shorts due to puncturing the insulation and to prevent excessive enlargement of the bundles.

Deviation: The above requirement will be complied with where disconnect splices are used. Where preinsulated permanent splices are used the sleeving may be omitted. The installation with respect to sleeving and staggering shall be subject to approval of the CTCI Board.

Reason for Change and Remarks: Sleeving and staggering are not necessary where nylon preinsulated permanent splices are used.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** MIL-Spec MIL-W-5088 (Cont)

185 3.16.5 Wiring

Requirement: 3.6.7.1 - Permanent splices shall not be used for salvaging short lengths of cable.

Deviation: It shall be permissible to connect potted connectors by means of permanent splices.

Reason for Change and Remarks: To facilitate fabrication and to provide for use of spare conductors where used in potted connectors.

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186 3.16.5 Wiring

Requirement: Paragraph 3.7.3 - "Cable groups shall contain no more than 26 cables, except as provided in Paragraph 3.7.3.2."

Deviation: It shall be permissible to install cable groups with more than 26 cables, provided, however, that such cable groups shall be kept to a minimum and shall be used only where such cable groups are required to go through congested areas.

Reason for Change and Remarks: The size of the airplane and the large number of cables required make it impossible to meet this requirement in all cases. To maintain design identical to F-102A airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
187	3.16.5	Wiring

Requirement: Paragraph 3.7.3.2 - Connectors - Wiring to connectors having more than 26 terminals may be run as single group provided all the wiring is pertinent to a single item of equipment.

Deviation: It shall be permissible to install more than 26 wires in a single connector not pertaining to a single item of equipment.

Reason for Change and Remarks: The size of the airplane and the large number of wires make it impossible to meet this requirement in all cases, and will permit the contractor to make the best possible design from the servicing standpoint.

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188	3.16.5	Wiring

Requirement: Paragraph 3.7.3.3 - Equipment - Cable groups containing more than 15 cables which pertain to a single item of equipment shall be separated from other cable groups.

Deviation: It shall be permissible to install cable group with more than 15 cables pertaining to single item of equipment with other cable groups, however, such cable groups shall be held to a minimum.

Reason for Change and Remarks: The size of the airplane and the large number of cables to be installed make it impossible to meet this requirement in all cases.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
189	3.16.5	Wiring

Requirement: Paragraph .3.7.3.4 --Cables of the primary electrical power system shall not be bundled or grouped with distribution circuit cables. Cables for each power source shall not be in the same bundle or group to prevent damage affecting more than one power source.

Deviation: It shall be permissible to deviate from the above requirements in areas which are so congested as to prevent compliance. Such installations shall be kept to an absolute minimum and approved by WADC.

Reason for Change and Remarks: The size of the airplane and the large number of cables to be installed make it impossible to meet this requirement in all cases.

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Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
190	3.16.5	Wiring

Requirement: Paragraph 3.7.3.5 - Essential Equipment - Cables to each equipment which must operate to maintain flight of the aircraft under normal or emergency conditions shall be separately routed from other cables.

Deviation: Not applicable.

Reason for Change and Remarks: The contractor considers there are no circuits that are classified as essential for maintaining normal or emergency flight of this aircraft.

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15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** MIL Spec MIL-W-5088 (Cont)

191 3.16.5 Wiring

Requirement: Paragraph 3.7.3.7 - Inspection and Maintenance - As a design objective, cable groups shall be installed to permit replacement of individual cables without removal of the group and to permit replacement of the group without removal of the bundle.

Deviation: It shall be permissible to put a maximum of four shields into a common terminal which will prevent removal of individual wires.

Reason for Change and Remarks: Use of individual terminals for each shield would require the addition of a considerable number of terminals and grounds.

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192 3.16.5 Wiring

Requirement: Paragraph 3.7.3.7.2 - Cable groups shall be installed in the form of quickly removable and replaceable harnesses, attachable and detachable from the adjacent harnesses and so located and supported to the structure that maintenance time is reduced to a minimum. As an installation objective, harnesses for a given installation shall be interchangeable in all models of the same series of aircraft. This installation may be accomplished by the use of disconnect splices, AN connectors, terminal blocks or other approved means acceptable to the procuring service.

Deviation: Harnesses may be installed in the airplane and connected by means of permanent splices as authorized in paragraph

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Mil Spec MIL-W-5088 (Cont)

192 (Cont) 3.16.5 Wiring (Cont)

3.6.7.1. Where this procedure prevents the removal of complete harnesses the requirements of this paragraph shall be waived.

Reason for Change and Remarks: Use of disconnect splices may be impractical and a substantial weight saving will be achieved by eliminating other types of disconnects, which would be necessary to meet these requirements.

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193 3.16.5 Wiring

Requirement: Paragraph 3.7.4.3 - Where cables are dressed downward to a connector.....a trap or drip loop shall be provided to prevent fluids or condensate from running into above devices.

Deviation: Drip loops shall not be required with "potted" or "E" type connectors.

Reason for Change and Remarks: These connectors are waterproof and the requirement is not applicable.

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194 3.16.5 Wiring

Requirement: Paragraph 3.8.1 Support Devices - Devices used for supporting cable shall be of an approved type which are

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec MIL-W-5088 (Cont)
194 (Cont)	3.16.5	Wiring (Cont)

replaceable by AN 742 cushion clamp, AN 931 grommets, MIL-T-6841 tape, MIL-C-5649 cord, or other approved devices.

Deviation: It shall be permissible to use nylon cable clamps, grommets, tape and cord, where wire in accordance with MIL-W-5274 or MIL-W-5086 or special application wires which are otherwise approved by AMC are used.

Reason for Change and Remarks: Nylon cable clamps, grommets, tape and cord is more suitable for use on this airplane since it will withstand Pratt & Whitney engine oil (Specification 521A MIL-C-7808) which is known to be detrimental to vinyl and rubber, also it has better abrasive characteristics. Nylon clamps are considerably lighter than AN 742 cushion clamps. (Ref AMC MCPPAF-6 (WCSF-6) AGA/ch dated 24 August 1953).

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195 3.16.5 Wiring

Requirement: Paragraph 3.10.1.2 - Flexible - Flexible metallic conduit conforming to Specification MIL-C-6136 shall be used only when the use of rigid metallic conduit is impracticable.

Deviation: It shall be permissible to install extra flexible conduit on the armament displacing gear. Conduit shall be approved by WADC.

Reason for Change and Remarks: Standard circuit is not suitable for use in this application.

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CONFIDENTIAL

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
196	3.16.5	Wiring

Requirement: Paragraph 3.11.1.2 - "Master diagrams shall be substantially in accordance with Drawing No. 45L6937, and may be on multiple sheets or in book form in accordance with Specification No. MIL-H-5473."

Deviation: Master diagrams shall be on individual sheets in accordance with Specification No. MIL-H-5473, except that no internal diagrams shall be required.

Reason for Change and Remarks: Internal diagrams will be included on the schematics and to include them on the circuit diagrams would be a duplication adding unnecessary work.

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Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
197	3.16.5	Wiring

Requirement: Paragraph 3.11.2 - "Practical diagrams - For all Air Force requirement, and when required by the Navy, practical wiring diagrams shall be placed on junction box covers or adjacent to junction centers, etc."

Deviation: Practical wiring diagrams will not be installed in the aircraft.

Reason for Change and Remarks: As adequate space is not available in desired locations, stowage of the prints in a less desirable location would be unsatisfactory due to damage caused by fluids and heat. As approximately 140 diagrams are required a considerable weight savings will result from this deletion. Circuit wiring and schematic diagrams will be contained in the airplane erection and maintenance manual.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-H-5440, dated 9, June 1950-Hydraulic Systems; Design, Installation and Test of Aircraft
198	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.5.4 - "Disengagement and By-Passing - Provisions shall be made in the design of power-boosted and power-operated surface control systems for disengaging the actuator in the event of failure or jamming of the actuator, control valve or connecting linkages. Provisions need not be made for re-engaging in flight. Provisions shall be made for automatically by-passing, where necessary, the fluid from one side of the actuator to the other in the event of a power system failure. In addition, provisions shall also be made for temporarily by-passing the fluid from one side of the actuator to the other during periods when it is desired to operate surface controls manually with the hydraulic pressure turned off and the actuator disengaged."

Deviation: Disengagement and by-passing will not be required.

Reason for Change and Remarks: This is not considered applicable to a full-power control system.

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199	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.14 - "Gages - Pressure gages in accordance with the applicable specifications listed in Section 2 shall be provided to indicate the system pressure in the hydraulic system or subsystems where necessary."

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Spec MIL-H-5440 (Cont)**

199 (Cont) 3.15.1.1 Hydraulic System (Cont)

Deviation: Remote reading indicators may be used.

Reason for Change and Remarks: To eliminate the routing of high pressure hydraulic lines within the cockpit area.

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200 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.25.4 - "Normal ground-servicing, fluid-level range shall be indicated with the accumulator or accumulators completely discharged of oil pressure and another level range to indicate the safe operating limit with accumulators charged to normal air and oil pressure."

Deviation: Indication of fluid level range, with accumulators filled with oil, is not required.

Reason for Change and Remarks: It is not practical to fill the reservoir with the system in operation and accumulators filled with oil.

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201 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.25.5 - "The reservoir pressure shall be controlled by an external, nonadjustable pressure regulating device set to 12 psig (26.7 psi) absolute which shall be connected to the air space above the oil level in the reservoir to protect the reservoir from rupturing..."

15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec No. MIL-H-5440 (Cont)
201 (Cont)	3.15.1.1	Hydraulic System (Cont)

Deviation: Pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of hydraulic pumps.

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202	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.29.3 - "The pressure drop from the reservoir to the pump intake port....shall be such that the pressure at the inlet port will not be less than 14 inches of mercury absolute nor more than 12 psig (26.7 psia)."

Deviation: Applicable, except as modified in deviation to paragraph 3.8.25.5 of MIL-H-5440.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps.

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15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-D-5481 dated 13 December 1949 Drawings and Data Lists; Preparation of (For Production Aircraft)
203	Requirement:	Paragraph E-3a. - "A general arrangement (complete assembly) drawing, drawings of all necessary assemblies and subassemblies, and separate detail drawings shall be made for all parts of the aircraft (except as specifically exempted herein). Figure 4 shows the installation and major assembly drawings required for conventional aircraft design. If any of the drawings listed in Figure 4 are not applicable to the specific aircraft design, applicable installation and major assembly drawings shall be substituted." Paragraph E-3d - "Assembly Drawings. - The assembly drawings for such items as wing panels, wing tips, rudder, stabilizers, etc., shall be complete units containing all necessary electrical, hydraulic, and fuel systems, etc., already installed, and shall clearly indicate that these installations are included as part of the assembly to which they pertain. Thus, the wing panel assembly drawing may be an outline drawing only, calling out the separate drawings covering the installation of the wing panel hydraulic system, electrical system, detail wing structure assembly, etc., as subassembly drawings."
	Deviation:	In lieu of a single airplane general assembly drawing the aircraft shall be defined by four top general arrangement or assembly drawings as noted below. All electrical, electronic instrument and instrumentation equipment, harness, installations, etc., not included as part of the basic structure shall be excluded from the major component assembly drawings. All electrical, electronic, instrument, and instrumentation items shall next assemble into their applicable general assembly drawings.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL- Spec MIL-D-5481 (Cont)
203 (Cont)		Airplane General Assembly Instrumentation General Assembly Electronic General Assembly Electrical & Instrumentation General Assembly

It shall be permissible to issue "typewriter" drawings to define major assembly spares.

Reason for Change and Remarks: The extensive and accelerated test programs established for these airplanes will necessitate numerous changes in each airplane, or small blocks of airplanes, to accomplish the end tests. From an analysis, these items subject to change fall within the electrical, electronic, instrument and instrumentation categories. Changes is these categories could cause creation of a complete number brakdown, including major assembly, for each airplane. In order to expedite the program, maintain a record of each airplane, establish spares applicable to all (or a majority of) airplanes and reduce the tast of number changing to a minimum the plan was evolved to separate the changeable categories from the basic airplane. To provide for major assembly spares usable on all (or a majority of) airplanes, a series of spares (typewriter) drawings would be established which would contain the necessary provisions to permit maximum usage. To use drawings common to F-102A airplane.

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204 2.3 Applicable Specifications

Requirement: Paragraph E-3h - "The flat pattern of all sheet metal parts shall be shown.

Deviation: It shall not be required that the flat pattern of all sheet metal parts be shown.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-D-5481 (Cont)
204 (Cont)	2.3	Applicable Specifications (Cont)

Reason for Change and Remarks: Sufficient information, will be shown on the drawings to permit development of a flat pattern and/or fabrication and parts. This is Contractor's standard practice at the Forth Worth Division.

Regarding paragraph E-3h (2), the contractor proposes to furnish for that section of the aircraft being designed at Contractor's Fort Worth Division, reproducibles made directly from the glass cloth drawings on which is superimposed an accurate 10" grid. Approval of this Deviation shall constitute approval of this procedure.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-C-5503A, dated 7 April 1950 Cylinders; Aircraft, Hydraulic Actuating
205	3.8	Alighting Gear

Requirement: Paragraph 4.5.7 - Extreme Temperature Performance (Testing methods described under paragraphs 4.5.7, 4.5.7.1, 4.5.7.2, and 4.5.7.3).

Deviation: Extreme temperature testing of landing gear actuating cylinders shall be performed on entire landing gear strut assembly to that requirement.

Reason for Change and Remarks: Testing of actuating cylinders separately would be duplicate testing. (See Convair Ltr 6-1638 dated 16 April 1953 and AMC Ltr MCPPAF-6 (WCOWF-6) RGA/ah dated 1 July 1953).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5514A, dated 7 June 1950 - Packings; Installation and Gland Design of Aircraft Hydraulic and Pneumatic (General Specification for)
206	3.15.1.1	Hydraulic System - Description and Components
	Requirement:	Paragraph 1.1 - "This specification is drawn to establish basic design criteria covering use and application of packings, packing glands, and related features as used in hydraulic system equipment in accordance with Specification No. MIL-H-5440, using MIL-O-5606 hydraulic fluid, and in pneumatic system applications, in accordance with Specification No. MIL-P-5518."
	Deviation:	Applicable, except that special seals may be required for local high temperature conditions. Such special seals shall be submitted to WADC for specific approval for each kind of application.

Reason for Change and Remarks: The seals of Specification No. MIL-P-5514 are not suitable for high temperature use.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518, dated 3 January 1950 - Pneumatic Systems; Design, Installation and Test of Aircraft
207	3.15.2	Pneumatic System

Requirement: Paragraph E-3b(2) - "Pneumatic units such as air bottles shall withstand a proof pressure equal to 200% of the system cut-off pressure."

Deviation: Proof pressure shall be 5/3 times the system cut-off pressure. (Reference Convair Specification No. 8-08359.)

Reason for Change and Remarks: Air bottles will be nonshatterable and shall withstand gunfire test. Higher testing pressures shall not be required.

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Deviation	Paragraph	
208	3.15.2	Pneumatic System

Requirement: Paragraph E-3C(2) - "Air bottles shall be capable of withstanding a burst pressure equal to 200% of the proof pressure."

Deviation: Burst pressure shall be 20/9 times the system cut-out pressure. (Reference Convair Specification 8-08359.)

Reason for Change and Remarks: Air bottles will be nonshatterable and shall withstand gunfire test. Higher testing pressure should not be required.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-P-5518 (Cont)

209 3.15.2 Pneumatic System

Requirement: Paragraph E-4 - "The pneumatic system shall operate satisfactorily within the range of outside air temperatures and altitudes shown in Figure 1. Under none of these conditions shall the temperature of the air under main system pressure in the air bottles and the remainder of the pneumatic system after the air bottles, exceed 71°C (160°F) during system operation. In the event that units such as hoses and valves located ahead of the air bottles would be adversely affected by temperatures above 71°C (160°F) provisions shall be made to limit the temperature of 71°C (160°F) during system operation."

Deviation: Component temperatures may exceed 160°F.

Reason for Change and Remarks: Components will be subjected to temperatures above 160°F due to aerodynamic and engine heating. There is insufficient cooling to maintain temperatures of 160°F or lower. These components will be designed and tested to insure proper operation at the temperatures they are exposed to.

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210 3.15.2 Pneumatic System

Requirement: Paragraph E-9c, last sentence - "Aluminum alloy fittings shall not be used with stainless steel lines."

Deviation: It shall be permissible to use male threaded aluminum alloy fittings with stainless steel lines in sizes -8 and above.

15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-P-5518 (Cont)
210 (Cont)	3.15.2	Pneumatic System (Cont)

Reason for Change and Remarks: This deviation, which will accomplish a maximum weight saving in design of the pneumatic system conforms with Para. 3.9.10 of MIL-P-5518A dated 3-26-53 (Ref CVAC ltr 6-1750 dtd 20 April 1954. Dev. approved by AMC ltr MCPPAF-6 (WCSF-6) SSS/feb dtd 28 June 1954.)

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211 3.15.2 Pneumatic System

Requirement: Paragraph E-13a(1) - "The ground charging connection shall be installed in accordance with Drawing AND 10071..."

Deviation: Applicable, except that AND 10071 valve installation may be replaced by a valve permitting greater air flow.

Reason for Change and Remarks: To reduce ground charging time.

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212 3.15.2 Pneumatic System

Requirement: Paragraph E-22a(1) - "The use of all packings shall be as specified in Spec. No. AN-P-74."

Deviation: Applicable, except that in special cases where friction forces are detrimental, other types of packings may be used subject to WADC approval.

Reason for Change and Remarks: Friction may be critical in certain valves.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-P-5518 (Cont)
213	3.15.2	Pneumatic System

Requirement: Paragraph E-25a - "Pressure gages AN5769 or AN5771, in accordance with Specification AN-G-2, shall be provided..."

Deviation: A low pressure warning light will be provided.

Reason for Change and Remarks: To simplify instrument panel and reduce weight and as approved by F-102A cockpit Mock-up Board 28 July 1954.

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15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-R-5520, dated 3 January 1950 - Reservoirs: Hydraulic
214	3.15.1.1	Hydraulic System
	Requirement:	Paragraph E-1i(2) - "Where pressurized reservoirs are used, means shall be provided to limit internal pressures to a maximum of 12 pounds per square inch gage."
	Deviation:	Applicable, except that the pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-5842 (USAF) dated 1 September 1950 - Transparent Areas; Anti-Icing, Defrosting and Defogging Systems, General Spec. for:
215	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.2.2.1 - "The windshield shall be defined as the transparent area or areas which are intercepted by a line through the eyepoint of the pilot (or copilot) in the forward and forward oblique direction (approximately 45° to either side of straight ahead) and which are normally used in flying and landing the aircraft."

Deviation: The windshield shall be defined as the glass area forward of the canopy break line.

Reason for Change and Remarks: Surface of transparent area aft of canopy break line is essentially parallel to free stream and will not be subjected to direct water impingement.

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Deviation	Paragraph	
216	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.3.1 - "All transparent areas essential to the mission....."

Deviation: The canopy transparent material will not be defrosted or defogged.

Reason for Change and Remarks: Defrosting and defogging protection is provided for the windshield in conformance with Spec MIL-T-5842.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-5842 (USAF) (Cont)
217	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.6 - "A clear vision panel (one which is openable in flight under conditions of ice, front and fog), or a section of transparent area maintained in a clear condition under conditions of ice, frost and fog, shall provide vision to the pilot in the event of failure of the normal defroster, defogging, or anti-icing system or systems."

Deviation: Emergency vision as defined in paragraph 3.6, 3.6.1, and 3.6.2 of Specification No. MIL-T-5842 will not be provided.

Reason for Change and Remarks: An openable panel is not considered practicable from the standpoint of clearance required and obstruction to pilot's vision due to framework required.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-5997 (USAF) dated 31 January 1951, Instruments and Instrument Panels Aircraft, Installation of
218	3.14.3	Installation - Instruments
	3.19.2.1	Panel - Installation
	Requirement:	(1) Paragraph 3.1.2 - "The main instrument panel (s) shall be mounted normal to the longitudinal axis of the airplane." (2) Finish - "The finish of the instrument panel shall be durable dull black." (3) Paragraph 3.2.1 - "All instrument panels shall be mounted on vibration absorbers constructed in accordance with the requirements of Specification MIL-A-5840." (4) Paragraph 3.3.4 - "The transmitters shall be mounted in a location where the temperature never exceeds 70°C."
	Deviation:	(1) The instrument panels shall be mounted with a slope of 15° measured forward of the plane normal to the longitudinal axis of the airplane. The J-8 attitude gyros shall be normal to flight attitude of the airplane. (2) The finish of the instrument panels shall be dark grey, Color No. 3520 of color specification TT-C-595. (3) Instrument panels shall not be mounted on vibration absorbers. Space provisions shall be made for vibration isolators and/or vibrators pending results of flight tests. (4) Instrument transmitters shall be mounted in compartments in which the temperatures shall not exceed 70°C for extended periods but may reach 120°C for periods not to exceed 15 minutes duration.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification MIL-I-5997 (USAF) (Cont)

218 (Cont) Reason for Change and Remarks: (1) To provide maximum visibility over the instrument panels, provide optimum visibility of the instruments on each panel and provide for the maximum number of instruments on the students panel while maintaining the optimum location of the radar scope. (2) Per F-102A mock-up board meeting 28-29 July 1954, RFA No. 48. (3) Experience with aircraft powered with gas turbines has indicated that the vibration transmitted to the instrument panel is within acceptable limits. (4) It is not considered necessary to use special transmitters for high temperature operation since high temperature, if for a limited time only, will not cause the temperature of the units to rise sufficiently to cause damage.

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219 3.19.2.1 Instrument Panel

Requirement: Paragraph 3.3.5 - Maintenance - All instruments and connections thereto shall be accessible for replacement without removing other instruments or equipment.

Deviation: The requirements of the above paragraph need not be adhered to.

Reason for Change and Remarks: Plastic sandwich lighting of the instrument panels makes it impossible to meet the requirements of the above paragraph. Sandwich lighting was requested by the Procuring Agency at F-102A lighting Mock-up.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-6051 dated 28 March 1950, Interference limits and Methods of Measurement; Aircraft Radio
220	3.17	Electronics
	Requirement:	Complete Specification.
	Deviation:	During accelerated development test program isolation and correction will not be made to noise interference caused by test instrumentation or special configuration installed.

Reason for Change and Remarks: Time involved and cost would prohibit isolation and correction of noise interferences caused by the temporarily installed special test instrumentation.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053, dated 1 June 1950 - Tests; Landing Gear Shock Absorber Drop
221	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Complete specification.

Deviation: Since the nose and main landing gears are the same as F-102A Airplanes, no testing is required on this airplane.

Reason for Change and Remarks: To use existing components of the F-102A airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-6140 dated 27 April 1950 "Insignia National Aircraft"
222	3.2.7	Identification and Markings

Requirement: Paragraph D2a (2) - "The insignia shall have a blue circle, excluding the border, with a maximum diameter of 60" and a minimum diameter of 30". Standard sizes shall have a blue circle diameters in multiples of 5". The blue circle diameter selected shall be the standard size which is closest to, but does not exceed 75% of the distance between the leading edge of the wing and the aileron cut out at the point of application."

Deviation: A blue circle of 40" diameter shall be used as specified on CVAC Drawing 8-90903.

Reason for Change and Remarks: Due to the Delta wing configuration, the Contractor arbitrarily chose a 40" diameter circle since it appears to be of adequate size and in keeping with the span of the wing, and conforms with the F-102A.

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Deviation	Paragraph	
223	3.2.7	Identification and Markings

Requirement: Paragraph D-2b (2), Size - "The insignia shall have a blue circle, excluding the border, with a maximum diameter of 50" and a minimum diameter of 20". Standard sizes shall have a blue circle diameter in multiples of 5". The diameter selected shall be the standard size which comes nearest to, but does not exceed 75% of the height of the projection of the fuselage or hull side of the point of application."

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CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-6140 (Cont)
223 (Cont)	3.2.7	

Deviation: The size and location of the national insignia on the fuselage shall be submitted to WADC for approval.

Reason for Change and Remarks: It is impossible to comply with the above requirements due to the fuselage configuration, wing location, and to afford placement of the insignia in such a position that it could be viewed without distortion.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-A-6224A, dated 25 September 1950 - Antenna for UHF Airborne Communications Equipment, General Specification for Design of
224	3.17.2.1.1	Radiation Pattern

Requirement: Paragraph 3.2.2.5 - "The antenna, when installed on an aircraft, shall receive and transmit a substantial amount of the total available energy as vertically polarized radiation within the zone between 30 degrees above and 30 degrees below the horizon. The azimuthal radiation patterns within the fore-going zone shall be free from deep null and sharp variations in gain."

Deviation: The azimuthal radiation patterns within more than 95% of the fore-going zone shall be free from deep nulls and sharp variations in gain.

Reason for Change and Remarks: Some deep nulls and sharp variations in gain are unavoidable consequences of the particular external configuration of this airplane and are therefore not controllable by the antenna design. Deep nulls and sharp variations in gain are defined as those variations in gain which drop to a value less than the gain of an isotropic radiator by at least 11 db.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A dated 18 January 1952 - Lighting Equipment, Aircraft Instrument Panel - General Specification for Installation of
224a	3.16.8.2	Interior Lighting

Requirement: Paragraph 3.2.2 - "The required types and quantity of aircraft lighting equipment shall be listed in the aircraft model specification."

Deviation: It shall not be required to list all aircraft lighting equipment by types and quantity in the aircraft model specification.

Reason for Change & Remarks: The major items of equipment are listed in the aircraft model specification by description only. The equipment section of the Contractor's Bill of Materials specifies the quantity and part numbers for all Contractor furnished equipment. To list this information in the Model Specification, and maintain it up to date, would be an unnecessary duplication of work.

Deviation	Paragraph	
225	3.16.8.2	Interior

Requirement: Paragraph 3.2.3.1 - The primary instrument lighting system shall consist of individual instrument lighting fixtures as specified by the Procuring Agency.

Paragraph 3.2.3.1.3 - Individual fixture for clamp mounted instruments. The fixture for the clamp mounted instruments shall be in accordance with Specification MIL-L-7581. Where instrument panel space prevents, the fixture shall be located above the top center of the instrument to be illuminated. In any event the fixture shall be located so as to permit the crew members, when seated in their normal positions, from seeing direct light from the fixtures, direct reflections of the light from the face of the instrument, or from the windshields.

CONFIDENTIAL

5 JAN 1955

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** Military Specification No. MIL-L-6423A (Cont)

225 (Cont) **Requirement:** (Cont) The final location shall be subject to the approval of the Procuring Agency.

Deviation: Sandwich type lighting of instruments may be used.

Reason for Change and Remarks: Sandwich type lighting of instruments requested by an approved by Mock-Up Board 7-8 April 1953, RFA #1.

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226 3.16.8.2 Interior:

Requirement: Paragraph 3.2.3.2 - The secondary instrument lighting system shall consist of Type A-11 red floodlights conforming to Specification No. 32639.

Deviation: Type A-11 red floodlights need not be used for the secondary instrument lighting system.

Reason for Change and Remarks: The light distribution of the A-11 floodlight is not compatible with the requirements for adequate lighting of this cockpit configuration. To maintain design identical to F-102A airplane.

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226a 3.16.8.2 Interior:

Requirement: Paragraph 3.2.3.3 - "The cockpits of all Air Force aircraft equipped for night flying shall be furnished with thunderstorm lights. The intensity and location of the lights shall be such that a light intensity of at least 10 ft candles is provided on the instrument panel."

Deviation: The average lighting intensity of the thunder storm lights on the instrument panel shall not be less than 7 ft candles.

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15 JAN 1955

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-L-6423A (Cont)

226a (Cont) Reason for Change and Remarks: Adequate thunderstorm lighting is provided as demonstrated at the cockpit lighting inspection held 30 Nov. - 1 Dec. 1954 (Ref RFA #20 of this inspection.

227 3.16.8.2 Interior

Requirement: Paragraph 3.2.3.4 - Provisions shall be made for controlling the light intensity of the primary system separately from that of the secondary system. Furthermore, the light assemblies shall be grouped on intensity controls in such a manner as to permit the pilot and copilot to control the light intensity of his flight instrument group separately from that of his engine instrument group. In the event that the cockpit arrangement is such that the pilot and copilot use the same group of engine instruments, the intensity control for this engine group shall be located so that it is readily accessible to both the pilot and copilot.

Deviation: Intensity control of instrument secondary lighting may be by only one control and need not be separately grouped as to flight instruments and engine instruments. This control will be located on the student's skirt panel, as presented at Cockpit Lighting Inspection of 30 Nov.-1Dec. 1954.

Reason for Change and Remarks: Configuration and limited area of instrument panels are such that separation of secondary lighting per specification is impractical and entirely unnecessary as was demonstrated in the F-102A lighting mockups and accepted by the Mock-Up Board 7-8 April 1953. To maintain design identical to F-102A airplane.

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228 3.16.8.2 Interior

Requirement: Paragraph 3.2.3.5 - The power for the primary and secondary instruments lighting systems shall be taken

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A (Cont)
228 (Cont)	Requirement: (Cont)	from an essential supply bus.
	Deviation:	The secondary lighting shall be supplied from the non-essential A. C. bus.

Reason for Change and Remarks: To stay within the requirements of the emergency A. C. generator. The output of this generator is limited by the hydraulic power during "Dead Stick" landing.

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229	3.16.8.2	Interior
	Requirement:	Paragraph 3.2.6 - Dimming Controls - "Inclosed type rheostats in accordance with Specification MIL-R-22 or MIL-R-6749 and Standard AN3155 shall be used as dimming controls for instrument lighting systems ...."
	Deviation:	Variable voltage autotransformers may be used for dimming controls on lighting circuits supplied from A.C. sources.

Reason for Change and Remarks: Some instrument panel lights are to be operated from the A. C. bus to conserve battery power during emergency as approved by F-102 Cockpit Mock-Up Board of 28 July 1954.

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230	3.16.8.2	Interior
	Requirement:	Paragraph 3.2.6.3 - Intensity Levels of Thunderstorm Lights - "The dimming controls for the thunderstorm lights shall provide a means for varying the voltage across the lamps from a maximum of approximately rated lamp voltage to 1/4 rated lamp voltage."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** Military Specification No. MIL-L-6423A (Cont)

230 (Cont) **Deviation:** Dimming shall not be provided.

Reason for Change and Remarks: RFA #66 - F-102A Cockpit Mock-Up Board 28-29 July 1954.

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Military Specification No. MIL-L-6503 (USAF) dated 5 July 1951 - Lighting Equipment: Aircraft, General Specification for Installation of

231 3.16.8.3 Exterior Lights

Requirement: Paragraph 3.2.1.1 - Navigation Light System - " .... shall be electrically connected to the navigation light system as shown on Figure 1."

Deviation: The AN 3131-303 lamp called for fuselage lights may be omitted and equivalant dimming accomplished by use of tapped transformer, with similar treatment for dimming of the wing and tail lights in lieu of resistors.

Reason for Change and Remarks: Navigation lights will be energized by A.C. sources to conserve battery power during emergency and to save weight.

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232 3.16.8.3 Exterior Lights

Requirement: Paragraph 3.2.1.1.1 - Wing Position Light Assemblies - The Wing position light assemblies shall be installed in accordance with Specification No. MIL-L-6730, etc. Light assemblies and associated equipment are included in Table I.

Deviation: Special lights may be installed as required and as approved by the Procuring Agency.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-L-6503 (USAF) (Cont)**

232 (Cont) — Reason for Change and Remarks: Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights. (Ref CVAC Ltr 8-3686 dated 17 July 1952, Paragraph 3.2)

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233 3.16.8.3 Exterior Lights

Requirement: Paragraph 3.2.1.1.3 - Fuselage light assemblies shall be installed in accordance with Specification MIL-L-6730 etc. The assemblies shall be connected into the electrical circuit as shown on Figure 1.

Deviation: 1. Special lights may be installed as required and as approved by the procuring agency.

2. The position lights shall be operated from the 115 volt A.C. essential bus through suitable transformers. Dimming shall be accomplished by use of appropriate taps on the transformer.

Reason for Change and Remarks: 1. Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights and circuitry. This installation was approved by WADC.

2. To provide greater endurance for the D.C. emergency power source, the essential bus is energized, during emergency, by the hydraulic driven A.C. generator. To save wire, thus reducing weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-L-6503 (USAF) (Cont)
234	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.3 - Taxi Lights - "The part number of the taxi lamp assembly is shown in Table I."

Deviation: Special light assembly suitable to the configuration of this airplane may be installed and shall be approved by the Procuring Agency.

Reason for Change and Remarks: Taxi light assemblies shown in Table I cannot be mounted satisfactorily in this airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (USAF) (Cont)
236	3.16.8.2	Interior Lights

Requirement: Paragraph 3.2.2.2 - Control Panel Lighting: All aircraft equipped for night flying shall have the labels, information plates, marking and other necessary indications, which are required for the operation of the control panel equipment, illuminated by use of light assemblies in accordance with Drawing AN-3502 or other types of assemblies approved by the Procuring Agency in conjunction with plastic lighting plates in accordance with Specification AN-P-89.

Deviation: Secondary lighting, in addition to primary lighting shall be provided for lighting the console. Secondary lighting may be used for lighting the side and aft circuit breaker panels. Plastic lighting plates need not be employed on the circuit breaker panels. Plastic lighting plates, when used, shall be in accordance with specification MIL-P-7788 in lieu of AN-P-89.

Reason for Change and Remarks: Secondary along with primary lighting of the consoles is recommended as a safety measure in the event of primary failure, and to give balanced cockpit lighting which is important to efficient night adaptation. Configuration location, and "in flight" need of lighting circuit breaker panels during night operation is such that primary lighting, per specification would be an unnecessary burden of weight, circuity and space utilization in view of pilot pratice of carrying some secondary light intensity during night operations as approved by F-102A Cockpit Mock-Up Board 28 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (USAF) (Cont)
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Deviation	Paragraph	Military Specification No. MIL-L-6503 (USAF) (Cont)
238	3.16.8.2	Interior Lights

Requirement: Paragraph 3.2.2.5 - Cabin Lighting: Cabin dome lights in accordance with Drawing AN3037 shall be used to provide general illumination of the radio, radar, navigator, bombardier, passenger, cargo, and engine nacelle compartments of aircraft.

Deviation: It shall be permissible to install Grimes light assembly (Drawing No. B-6245-24) in lieu of AN3037 light assembly.

Reason for Change and Remarks: AN3037 light assemblies are too large and heavy to be practicable for this type of airplane. The use of Grimes light assembly was approved by the F-102A Mock-Up Board.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec No. MIL-L-6503 (USAF) (Cont)
239	3.16.11.3	Warning Lights

Requirement: Paragraph 3.2.2.8.1 - "Warning lights shall be red non-dimming, small jewel in accordance with Drawing AN3157, and shall be provided in connection with systems over which operating personnel have no control and gives a warning of trouble not caused by personnel action and indicates immediate action required to prevent immediate loss of aircraft."

Deviation: (a) All warning lights are automatically dimmed when the flight instruments primary lights are turned on, except that they shall not be dimmed when the thunderstorm lights are on.

(b) Warning lights shall be of the two-bulk type similar to "Korry P/N 204...."

Reason for Change and Remarks: (a) To alleviate the possibility of the pilot being blinded when a warning light comes on. The configuration of the cockpit and the mission of the airplane necessitates the integration of the entire cockpit for maximum utility and the warning system particularly will be of nonstandard configuration. (Requested and approved by F-102A Mock-Up Inspection Board on 7 and 8 April 1953, RFA #8, and F-102A cockpit Mock-Up Inspection on 29 July 1954).

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Deviation	Paragraph	
240	3.16.11.3	Warning Lights

Requirement: Paragraph 3.2.2.8.2 - Caution Light: "Caution Lights shall be amber, dimming, small jewel, in accordance with Drawing AN3157...."

9 8 '54

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec No. MIL-L-6503 (USAF) (Cont)
240 (Cont)	3.16.11.3	Warning Lights (Cont)

Deviation: Caution light shall be of the two-lamp type similar to "Korry P/N 204...."

Reason for Change and Remarks: Master warning light was declared to be a "Caution Light" by F-102A Mock-Up Board of 7 and 8 April 1953 and 28 and 29 July 1954, which brings it under this specification requirement. However, in size and arrangement, it must be treated similarly to the regular warning lights.

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241 3.16.8.2 Interior Lights

3.19.7 Spare Bulbs

Requirement: Paragraph 3.2.3 - Spare Lamps: "All aircraft shall be furnished with one spare lamp for each 3 lamp assemblies (or fraction thereof) of each different type of lamps used for interior lighting.

Deviation: To provide stowage for a minimum of 10 spare midget flanged base lamps only in addition to the normal requirements for spare candelabra and miniature based lamps.

Reason for Change and Remarks: Compliance with the above requirement would result in provisioning for stowage of 50 spare midget flanged based lamps. The Contractor believes this would be an unwarranted waste of space and weight considered against the realities of spare lamp replacement accomplished by the pilot during any mission. Also, the loss of one lamp on any one instrument does not render the instrument nonvisible. Approved by F-102A Cockpit Mock-Up Board 28 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-A-6543 Antenna System, L Band, Omni-Directional General Specification for
242	3.17.3.8.1	Radiation Pattern

Requirement: 3.4.6 - Field Strength Pattern - The field strength pattern of the installed antenna system shall be essentially omni-directional in the horizontal plane. The minimum acceptable voltage field strength pattern shall be as follows, using the spherical coordinate system as illustrated in Figure 1.

3.4.6.1 - At any azimuth angle ϕ in the planes defined by the angle $\theta = \pm 5^\circ$, the field strength shall be equal to or greater than that of an isotropic radiator in free space with equal input power.

3.4.6.2 - At any azimuth angle ϕ in the planes defined by $\theta = 80 \pm 5^\circ$, the radiation loss shall not exceed 1 decibel with respect to an isotropic radiator in free space with equal input power.

3.4.6.3 - At any azimuth angle ϕ in all planes from $\theta = 50^\circ$ to $\theta \pm 75^\circ$ and from $\theta = 105^\circ$ to $\theta = 130^\circ$, the radiation loss shall not exceed 4 decibels with respect to that of a free space isotropic radiator of equal input power except as modified in 3.4.6.4.

3.4.6.4 - In either the upper or lower hemisphere, but not both, from $\theta = 50^\circ$ to $\theta = 75^\circ$ or from $\theta = 105^\circ$ to $\theta = 130^\circ$, a minimum or minimums of field strength may exist having a total azimuth angle ϕ, as measured between the -4 decibels gain points, of not more than 90° in any plane. However, the radiation loss at such a minimum or minimums shall not exceed 10 decibels with respect to an isotropic radiator in free space with equal input power.

CONFIDENTIAL

15 OCT 1954

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Spec. No. MIL-A-6543 (Cont)
242 (Cont)	Deviation	The field strength pattern of the installed antenna system shall be the multilobed pattern which results when two antennas, which are separated by several wave-lengths, are fed in parallel. An any azimuth angle $\emptyset$ in the planes defined by the angle $\theta = 90 \pm 40^\circ$, the envelope of this multilobed pattern shall represent field strength equal to or greater than that of an isotropic radiator in free space with equal input power, except as follows: A deep null in the previously specified envelope shall exist in the solid angle defined by $\emptyset = 180 \pm 10^\circ$ and angles of θ greater than 70° and less than 90°. The greater lobes of this multilobed pattern shall occupy greater than 60% of the total solid angle of the specified envelope of radiation coverage. The lobe structure of this radiation pattern shall be sufficiently fine to provide an average lobe width of approximately 4.5° and an average null width of approximately 2.25°, at the isotropic level of this antenna system, in horizontal planes. In vertical planes, the average lobe width shall be approximately 7°, and the average null width shall be approximately 3.5°, at isotropic level.

Reason for Change and Remarks: The external configuration of the Delta wing airplane does not permit the use of a single antenna to provide the required coverage for this function. It is therefore necessary to use two or more antennas in a multiple antenna system.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Spec. No. MIL-A-6543 (Cont)
242 (Cont)	Reason for Change and Remarks: (Cont)	

At the present state of the art, satisfactory methods of multiplexing two or more antennas, at the same frequency, are limited.

Two paralleled antennas, whose patterns taken separately cover all the specified directions of radiation, can provide a radiating IFF system with a high probability of response to interrogating signals which arrive at directions within the specified coverage zones.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6730, dated 9 June 1950 - Light Equipment; Exterior, Installation of Aircraft (General Specification)
243	3.16.8.3	Exterior Lights

Requirement: Paragraph C-2 - "When applicable, aircraft exterior lighting systems shall contain the light assemblies shown in Table III."

Paragraph D-3b - Both top and bottom fuselage lights shall be equipped with clear white glass covers as specified in Table III."

Deviation: Special lights may be installed as required and as approved by the USAF.

Reason for Change and Remarks: Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights.

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244	3.16.8.3	Exterior Lights

Requirement: (1) Paragraph D-1a - Wing position light assemblies shall be installed on the tips of the outer wing panel as illustrated in figures #1 and #2.

(2) Paragraph D-1c - Wing position lights shall be visible from all positions within a 90 degree angle above and below the horizontal and within a 110 degree horizontal angle as illustrated on figures #1 and #2.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-L-6730** (Cont)

244 (Cont)

Requirement: (3) Paragraph D-3a - Fuselage light assemblies shall be installed midway between the nose and the tail of the aircraft, but aft of the pilot cockpit. The top light shall be directly above the bottom light and the line through these two lights shall be perpendicular to the thrust line of flight.

Deviation: Wing position lights to be installed in accordance with contractor drawings subject to approval by WADC.

Reason for Change and Remarks: The Delta wing planform and the missile bay configuration does not lend itself to wing and fuselage light installations of figures #1 and #2. Approved by AMC letter dated 27 July 1954.

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245 3.16.8.3 Exterior Lights

Requirement: Paragraph D-2a (3) - Tail position lights shall not be installed where they will be subject to heat in excess of that specified in Specification AN-L-12.

Deviation: Tail position lights may be subject to a temperature of 250 degrees F, subject to WADC approval.

Reason for Change and Remarks: Locating tail position lights in an area where they would not be subject to a temperature in excess of the 160 degrees specified by AN-L-12 would result in a severe weight penalty, due to the dense structure involved. Refer to CVAC Drawing No. 8-09032 (Proposal-Tail Position Lights) submitted to USAF for approval with CVAC Ltr No. 6-3790 dated 16 August 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6730 (Cont)
246	3.16.8.3	Exterior Lights

Requirement: Paragraph D-2c Visibility - Tail position light assemblies shall be visible from all positions within 90 degrees above and below and right and left of the airplane fuselage thrust line when viewed from the rear.

Deviation: Visibility of tail position lights shall be as shown on CVAC drawing No. 8-09032 (Proposal-Tail Position Lights) submitted to USAF for approval with CVAC Ltr No. 6-3790 dated 16 August 1954 and as finally approved by WADC.

Reason for Change and Remarks: Location possible for tail position lights results in 88 1/2 degrees aft visibility in lieu of 90 degree requirement.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-C-6822(1), dated 6 October 1950 - Clamp; Mounting, 2-Inch Size Instrument - Installation of
247	3.14.3	Instrument Installation

Requirement: Figure 1 - Specifies that clamps are to be mounted 45° from vertical.

Deviation: Clamps shall be installed to obtain maximum density of instruments within each panel.

Reason for Change and Remarks: Space in the student's panel is very limited and high density instrument spacing is imperative to maintain good vision over the panels.

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248	3.14.3	Installation

Requirement: Paragraph 4.3 - "It shall be determined that the flexible tube or wire available in front of the panel when the instrument is withdrawn, is a minimum of 4 inches.

Deviation: Flexible tube, wire, etc, shall be of sufficient length to permit disconnect from the instruments prior to withdrawal from the hinged panel.

Reason for Change and Remarks: Minimum of 4 inches is not realistic on this type installation as the panels are hinged at the bottom thus requiring varied lengths of tubes, wire, etc for withdrawal and disconnect depending on the position of the instrument.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6880A dated 30 Jan 1952 - Lubrication of Aircraft, General Specification for
249	3.2.10	Lubrication

Requirement: Paragraph 3.4.2.3 - "Fittings where required for pressure lubrication shall be in accordance with Specification MIL-F-3541 and Standards MS15000, MS15001, MS15003 and MS15006."

Deviation: It shall be permissible to use NAS 497 and NAS 516 flush type fittings.

Reason for Change and Remarks: In certain applications clearance problems dictates the use of NAS flush type fittings. In other applications it is more adviseable to use a press fitting rather than the screw type fitting. The NAS 497 fitting will be used until current stock is depleted which will then be replaced by the NAS 516 fitting.

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15 OCT 1954

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080, dated 27 December 1950 - Electrical Equipment; Installation of Aircraft, General Specification
250	3.16.4	Equipment - Installation
	Requirement:	Paragraph 3.1.5 (j) - "Ventilation: Adequate ventilation shall be provided. An operating temperature range of -55°C (-67°F) to +70°C (+158°F) has been established as the goal to which the design and manufacture of electrical equipment must be directed. It is required that electrical equipment be installed in such manner that these temperature ranges will not be exceeded under normal operating conditions of the aircraft unless otherwise specified."
	Deviation:	Temperatures in excess of the limits specified shall be permissible under high speed flight conditions, provided that it is demonstrated that the temperature is of such short duration and of such a value that the equipment shall not be damaged.

Reason for Change and Remarks: The short duration of excess temperature makes damage to equipment extremely unlikely and the weight and compromises of design required to keep the temperature within the specified limits is not warranted. To maintain design identical to F-102A airplane.

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251	3.16.5	Wiring
	Requirement:	Paragraph 3.1.9 - "Wiring shall be installed in accordance with Spec. AN-W-14."
	Deviation:	Wiring shall be installed in accordance with Spec. MIL-W-5088.

15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
251 (Cont)	3.16.5	Wiring (Cont)

Reason for Change and Remarks: To specify applicable specification.

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Deviation	Paragraph	
252	3.16.4	Equipment - Installation

Requirement: (1) Paragraph 3.3.1 - Types. - Circuit breakers shall conform to Specification MIL-C-7079. Circuit breakers above 50 ampere capacity and those required for A.C. Circuits shall be approved by the Procuring Service....'"

(2) Paragraph 3.3.1 - Fuses.... shall not be used unless authorized by the Procuring Service.

Deviation: (1) Circuit breakers shall conform to Specification No. MIL-C-5809 or shall be a substitute trip-free breaker approved by the USAF. These breakers shall also be used for protection of alternating current circuits.

(2) Fuses may be used for the protection of the fuel booster pump power circuits.

Reason for Change and Remarks: (1) Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF models. (2) The airplane generating system will not accept the overload characteristic of circuit breakers of the size required to protect the boost pump wiring - Fuses provide closer overload protection.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
253	3.16.4	Equipment - Installation

Requirement: Paragraph 3.3.2.1 - "Push-pull circuit breaker shall conform to Drawing AN 3161 and shall be used for circuit protection and emergency control."

Paragraph 3.3.2.2 - "Switch circuit breakers shall conform to Drawing AN 3160......"

Deviation: Push-pull breakers shall conform to Drawings MS25005 and MS25006, switch breakers shall conform to Drawings MS25003 and MS25004 or shall be a substitute trip-free breaker approved by USAF.

Reason for Change and Remarks: Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF Models. To maintain design identical to F-102A airplane.

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254	3.16.7	Controls

Requirement: Paragraph 3.4.1.2 "Switches shall be installed in accordance with AND10453."

Deviation: Switches shall be installed in accordance with AND10453 wherever practicable.

Reason for Change and Remarks: Due to the limited space in the cockpit it may be necessary to space switches closer than specified.

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15 OCT 1954

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-E-7080 (Cont)
255	3.16.7	Controls

Requirement: Paragraph 3.4.1.4 - "Space shall be provided on each switch panel, containing four or more switches for the subsequent installation of one spare switch conforming to Drawing AN3022 and one switch conforming to Draw-AN3023."

Deviation: Space may not be available to meet the above requirement.

Reason for Change and Remarks: Maximum amount of space for subsequent switch installation shall be provided. However, due to large amount of instrumentation and switches, and configuration of the cockpit, it is impractical to comply with the above requirement.

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Deviation	Paragraph	Military Specification MIL-E-7080 (Cont)
256	3.16.11.4	Meters

Requirement: Paragraph 3.5.2 - "The installation and location of meters shall be such as to afford good visibility and to minimize effects of parallax."

Deviation: Meters shall be located such that the effects of parallax, when unavoidable, shall be toward the safe side on metered quantities, considered by the Procuring Services, to be least detrimental to operation and/or safety of the aircraft.

Reason for Change and Remarks: To maintain F-102A arrangement for student.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
257	3.16.13	Relays

Requirement: Paragraph 3.6.1 - "Relays shall conform to Specification MIL-R-6106 and the applicable AN drawings."

Deviation: As required, relays may be of a design not covered by AN drawings subject to the approval of the Procuring Agency.

Reason for Change and Remarks: Special problems on this airplane requires the use of nonstandard relays.

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Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
258	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.7.1 - Types - Cutouts shall conform to Specification MIL-C-5026.

Paragraph 3.7.2 - Installation - Cutouts shall be installed in accordance with Drawing AN3025.

Deviation: The requirement of the above paragraph shall not apply.

Reason for Change and Remarks: The reverse current cutout function is included as a part of the D.C. control panel.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
259	3.16.4	Equipment - Installation

Requirement: Paragraph 3.8.1 - "Rheostats shall conform to Specification MIL-R-6749, and are available in various standard capacities as shown on Drawing AN3155."

Deviation: (1) It shall be permissible to use rheostats in accordance with JAN-R-19 and JAN-R-22.

(2) It shall be permissible to use Ohmite taper wound power rheostats where necessary.

Reason for Change and Remarks: (1) These rheostats are approved and can be obtained in smaller dimensions than the AN3155 rheostats, thereby conserving space in the cockpit. (2) Ohmite taper wound power rheostats are required in some installations to provide sufficient electrical capacity and to fit into available space where neither AN or JAN rheostats will completely fulfill the requirements.

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Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
260	3.16.10.3	Fuel Nozzle Grounding Jack

Requirement: Paragraph 3.10 - Fuel nozzle grounding receptacles shall be installed in accordance with Drawing AND 10439.

Deviation: It shall be permissible to install fuel nozzle grounding receptacle less than 12 inches from the pressure refuel adapter fitting.

Reason for Change and Remarks: The space limitations and the location of receptacle makes it impossible to comply with above requirements. The location of the receptacles was approved by the F-102A Mock-up Board.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
261	3.16.10.1	External Power

Requirement: Paragraph 3.15.3 (c) "..... The external power receptacle shall not be installed in wheel wells or bomb bays."

Deviation: The external power receptacle will be located in the left hand wheel well at approximately buttock line 25.5, waterline 27.75 and station 443.3 and will be provided with pull away disconnect through a hole in the wheel well bulkhead. A second D.C. external power receptacle will be installed in the aft electronics compartment forward of station 443.3.

Reason for Change and Remarks: The configuration of this aircraft and the amount of electronic equipment installed preclude installation to the above requirement and the requirement of Paragraph 3.17.3 of Specification MIL-E-7563. The second external power receptacle will permit operation of the main landing gear while the aircraft is on jacks.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (USAF) dated 1 July 1952 - Electrical Equipment, Aircraft, Installation of (General Specification)
262	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.6.1 - "On aircraft with one generator the generator circuit shall conform to Drawing No. 49B7560. The total resistance from the "GEN" terminal of the relay switch conforming to Drawing AN3025 to the "B" terminal of the voltage regulator thence from the "A" terminal of the regulator to the "A" terminal of the generator shall not exceed 0.25 Ohm."

Deviation: The direct current generator circuit shall be of special design conforming to Convair Drawings to be submitted for WADC approval.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to improved simplified design of the direct current circuit.

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Deviation	Paragraph	
263	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.6.5 - Generator controls shall consist of one ammeter per generator, one control switch per generator, one "Generator-off" indicator light per generator, one voltage adjusting rheostat per regulator, if required, ond one voltmeter .... These controls shall be grouped together on the pilots or engineers electrical panel.

16 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
263 (Cont)	3.16.2.1	Direct Current Power Supply (Cont)

Deviation:

1. A voltmeter shall not be required.
2. An ammeter shall not be required.
3. The generator switches shall be as required by the simplified control system, and shall be subject to approval by WADC.

Reason for Change and Remarks: 1. The duration of operation and the complexity of the airplane makes provisions for reading voltage unnecessary and undersirable.

2. As approved by Cockpit Mock-Up Board 28 July 1954.

3. The simplified control system will reduce the number of operations required during an emergency.

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264 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.7.2.1 - The generator circuit protector shall be located as close as is practicable to the generator bus to reduce exposures to electrical faults and in no case shall be located more than 3 feet from the generator bus.

Deviation: Not applicable. Circuit protectors in the generator circuit shall be installed to provide adequate protection of the system, and shall be subject to approval by WADC.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the improved simplified design of the direct current circuit, and due to the fact that the feeder bus from the generator tying to the distribution bus is so short.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
235	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.7.3 - Distribution network.

Deviation: Not applicable.

Reason for Change and Remarks: This requirement is applicable to multi-generator installations only.

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236	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.8.1 - Regulator sub-base. - Direct current voltage regulators shall be mounted on a sub-base in accordance with Drawing No. BE-49C7513. The sub-base shall be installed in a horizontal position when the airplane is in a normal flight attitude.

Deviation: No regulator sub-base shall be installed.

Reason for Change and Remarks: Regulator is included as a part of the D.C. Control Panel.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** Military Specification No. MIL-E-7563 (Cont)

267 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.9.1 - Reverse current cutout shall be accessible for unhampered inspection and maintenance.

Deviation: The requirements of the above paragraph shall not apply.

Reason for Change and Remarks: The function of the reverse current outout are included in the D.C. Control Panel.

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268 3.16.9 Ignition and Starting Control System

Requirement: Paragraph 3.10.2 Installation - For jet engine starting, the system shall consist of a split bus which will be tied to the main aircraft bus during air starts. It will be isolated during the ground starting cycle. The circuitry shall be as specified by the Procuring Agency.

Deviation: The starting control system shall be designed to the requirements of the manufacturer of the specified engine. Controls and circuitry shall be subject to WADC approval.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the fact that electric starters are not used.

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15 OCT 1954

~~CONFIDENTIAL~~

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Military Specification No. MIL-E-7563 (Cont)

269 3.16.7 Controls

Requirement: Paragraph 3.13.1 - Hermetically sealed limit switches and switch actuators, if available, shall be used on all landing gear control and all landing gear warning systems where limit switches are required.

Deviation: Limit switches in enclosed housing may be used on nose landing gear with the approval of the Procuring service.

Reasons for Change and Remarks: Hermetically sealed switches of the type required, due to extreme space limitations on the nose landing gear, are not available.

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270 3.16.11.1 Alarms

Requirement: Paragraph 3.15.1 - The landing gear indicating and warning system for all aircraft with retractable landing gear units shall consist of one AN5839 indicator in accordance with Specification MIL-I-6839 ....., and an audible signal.

Paragraph 3.15.4 - Landing Gear Warning Signal. Unless otherwise specified by the Procuring Agency, the audible signal shall consist of a Type J-2 horn in accordance with Specification No. 32462, etc.

Paragraph 3.15.5 - The landing gear warning signal shall be electrically interconnected with the landing gear indicating system, etc.

Paragraph 3.15.6 - The landing gear indicating and warning system shall be installed in accordance with Drawing No. 49B7565 and shall not be interconnected with any other circuit of the aircraft.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
270 (Cont)	3.16.11.1	Alarms (Cont)

Deviation: A landing gear warning horn is not required.

Reason for Change and Remarks: Omission of a warning horn on the previous TF-102A mock-up inspection of 5, 6 Jan. 1954 was not critized. To agree with F-102A cockpit.

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271	3.8.2.5	Retracting, Extending and Locking System
		Landing Gear Indicating and Warning Systems

Requirement: Paragraph 3.15.3. - The light shall be on to illuminate the red, wheel shaped knob when any gear is not exactly consistant with the position selected by the landing gear control.

Deviation: Landing gear control knobs shall be clear translucent plastic with red light bulb, which shall cause plastic to glow red when any gear is not exactly consistant with the position selected by the landing gear control.

Reason for Change and Remarks: (a) Red plastic control knobs glow in direct sunlight, resulting in impression that light is on and gear out of position.

(b) USAF design drawing AD 26 requires that landing gear control knob be of clear translucent plastic.

(c) Approved by Mock-Up Board of 28-29 July 1954. Ref. RFA #66. (F-102A)

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CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** Military Specification No. MIL-E-7563 (Cont)

272 3.16.7.1 Power Controls

Requirement: Paragraph 3.17.3 "For interceptor type aircraft the external power receptacles shall be so installed to permit automatic release of the external power cables upon movement of the aircraft."

Deviation: Installation of external power receptacle shall be made in such a manner as to disconnect the cables by movement of the airplane in pulling away from the mooring location.

Reason for Change and Remarks: To comply with Air Force request made at the mock-up inspection.

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273 3.16.4 Equipment - Installation

Requirement: Paragraph 3.19.1 - Rheostats shall conform to Specification MIL-R-6749 and are available in various standard capacities as shown on Drawing AN3155. Special rheostats not covered by the above specification shall be selected from Specification JAN-R-22.

Paragraph 3.19.2 - Special Purpose Rheostats - Special purpose rheostats, when required, shall be installed as directed by the Procuring Agency.

Deviation: It shall be permissible to use rheostats in accordance with JAN-R-19.

Reason for Change and Remarks: These rheostats are approved and can be obtained in smaller dimensions than the AN3155 rheostats, thereby conserving space in the cockpit.

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CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-E-7563** (Cont)

274 3.16.11.4 Meters

Requirement: (1) Paragraph 3.21.1 - An ammeter in accordance with specification No. MIL-A-5125 shall be installed.

(2) Paragraph 3.21.2 - A direct current voltmeter in accordance with Specification No. MIL-A-6752 shall be installed.

Deviation: (1) A direct current ammeter shall not be required.

(2) A direct current voltmeter shall not be required.

Reason for Change and Remarks: As approved by the F-102A Mock-Up Board and for weight savings.

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275 3.16.11.3 Warning Lights
3.16.11.4 Meters

Requirement: Paragraph 3.21.3 - Meters shall be located on the pilot's or engineer's instrument panel and shall be grouped together and in close proximity to the generator control switch and the generator failure indicating lights.

Deviation: (a) The generator failure indicating light shall be located on the master warning panel.

(b) The location of the meter and generator failure lights shall be subject to AF approval.

Reason for Change and Remarks: Congestion in the cockpit and the requirements for giving preference to the Fire Control System controls makes compliance impossible. As approved at cockpit Mock-Up inspection 29 July 1954. (F-102A)

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-7788, dated 28 October 1951 - Plate, Plastic Cockpit and Interior Controls Lighting
275a	3.19.2.1	Instrument Panels
	Requirement:	Paragraph 3.3.3 Color-"The background shall be black."
	Deviation:	All instrument and switch panels forward of the pilots, excluding the center and side consoles, shall have gray background (#3520).

Reason for Change and Remarks: Per decisions reached at F-102A Mock-Up Inspection of 28-29 July 1954, and TF-102A Nose Section Mock-Up Inspection of 28-29 Sept. 1954.

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Deviation	Paragraph	
276	3.16.8.2	Lighting - Interior
	Requirement:	Paragraph 3.7 - Mounting - "Light assemblies shall not be employed to secure plastic plates to the mounting plate. Number 4-40 washer-head screws (Blackhead) with captive nuts attached to the mounting plate, and a thin-walled bushing shall be employed to secure the plastic plate to the mounting plate. The bushing shall be designed to prevent excessive pressure on the plastic plate. Other devices may be provided when approved by the procuring agency."
	Deviation:	All plastic panels requiring more than one light assembly may be secured to the mounting plate by means of the light assembly cap and rubber light seal grommet only.

15 OCT 1954
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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-7788, (Cont)
276 (Cont)	3.16.8.2	Lighting - Interior (Cont) All plastic panels requiring only one light assembly shall have at least one attachment in addition to the light assembly cap and grommet. This attachment may be a #6-32 AN526 truss head screw with captive nut attached to the back of the mounting plate.

Reason for Change and Remarks: To allow the use of light assemblies to secure the plastic light plate to the mounting plate for plastic lighting panels. This change requested by CVAC Letter 6-5918 dated 12-30-52 and approved by AMC Letter MCPPAF6 (WCOWF) HCH/bh dated 2-20-53.

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APPENDIX

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military specification No. MIL-G-7818 dated 26 November 1951 - Gage, Fuel Quantity Capacitor Type, Compensated, General Specifications for
277	3.12.9.9	Quantity Gages and Flowmeters

Requirement: Paragraph 3.6 - "Hook-Up wire and external unshielded connector cable shall be in accordance with Specification JAN-C-76."

Deviation: Wire conforming to Specification MIL-W-5274A may be used for inter-component connection.

Reason for Change and Remarks: To provide uniform type wire usage in the aircraft. (AMC Ltr MCPPAF-6 (WCOWF-6) dated 3 July 1953).

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15 OCT 1954

CONFIDENTIAL

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-7890 Installation of Anti "G" Suit Pressure Regulating Valve in Jet-Propelled Aircraft
278	3.19.1.2	Anti "G" Suit Valve

Requirement: Paragraph 3.3.11.1 - Pressure - The system from the air compressor of the jet engine to the pressure regulating valve shall operate at a maximum gas pressure of 125 psi.

Deviation: The system pressure will exceed 125 psi. System pressure will be 200 psi maximum.

Reason for Change and Remarks: Air from the turbo-jet engine will be led to the pressure regulating valve. The pressure of this air is compatible with pressures shown in Military Specification for the regulating valve MIL-V-9370 under paragraph 1.1.

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279	3.19.1.2	Anti "G" Suit Valve

Requirement: Paragraph 3.5.4.1 - The pressure-regulating valve shall conform to AN6538. The valve shall be located in the cockpit on the left side of the pilot. The valve shall be mounted within normal sight and reach of the pilot to facilitate selection of high or low pressure settings during flight.

Deviation: (a) The pressure regulating valves shall be in conformance with Specification MIL-V-9370.

(b) The valves shall be located on the outboard side of each pilot in the aft portion of the side console.

15 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-7890 (Cont)
279 (Cont)	3.19.1.2	Anti "G" Suit Valve (Cont)

Reason for Change and Remarks: (a) Per ECP 13 (CCN #23) requested by USAF.

(b) Space limitations prohibits locating valve any further forward.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-G-7940, Gages, Fuel Quantity, Capacitor Type, Installation and Calibration
280	3.12.9.9	Quantity Gages and Flowmeters

Requirement: Paragraph 3.4.6 - ......the solderless type terminals shall be in accordance with Drawing AN659.

Deviation: Preinsulated-type terminals approved by the procuring service shall be used and shall be replaceable by AN659 terminals.

Reason for Change and Remarks: To make tank wiring consistent with balance of airplane wiring.

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Deviation	Paragraph	
281	3.12.9.9	Quantity Gages and Flowmeters

Requirement: Paragraph 3.6.2.1 - The unit containing the calibration adjustment, wherever practicable, shall be so located that the indicator is visible while adjustments are being made.

Deviation: The indicator need not be visible while adjustments are being made.

Reason for Change and Remarks: The congested condition of the cockpit precludes the possibility of location for the calibration unit therein.

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15 OCT 1954

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memorandum Report No. MCREXP-524-3006, dated 1 December 1950 - "Design of Pressure Refueling Systems for Aircraft"
282	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.4 - "Design Criteria - Refueling." ...."Under these conditions, line sizes in the refueling systems are to be selected such that all tanks theoretically reach the full position simultaneously." Complete refueling in 3 minutes but not exceeding 600 GPM."

Deviation: No special provisions shall be made to insure that both L. H. and R. H. tanks reach full simultaneously. Tank lines shall be designed for a maximum refueling rate of 200 GPM. Complete refueling in 6 minutes but not to exceed 200 GPM.

Reason for Change and Remarks: To save weight and to prevent high pressure build-up in the tank during filling.

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283	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.5 - "Design Criteria - Defueling - The system shall provide for ground defueling of the airplane at a minimum rate of 200 GPM when suction pressure of 11 psig is applied to the airplane adapter at the inlet of the type D-1 nozzle. When suction is not available, the airplane booster pumps shall be capable of pumping all fuel out of the airplane through the adapter and nozzle but not necessarily at the above rate. Vent lines shall be adequate to allow a defueling of the maximum rate from each tank individually when the above suction is applied without experiencing any negative pressures within the tank."

15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph Memo Report No. MCREXP-524-3006 (Cont)

283 (Cont) 3.12.9.13 Refueling Provisions (Cont)

Deviation: Defueling shall be accomplished by using booster pumps with tanks pressurized by an external source, or by tank pressurization and suction. In the latter case the defueling rate shall be not less than 45-50 GPM/side.

Reason for Change and Remarks: Considerable weight savings is realized by not complying with above in that extremely large size line would be required. Also, it is necessary that tanks be pressurized and sequenced for c. g. control.

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284 3.12.9.13 Refueling Provisions

Requirement: Paragraph 3.8 - "Tank Selection - It shall be possible to select any tanks for filling and conversely to avoid filling any tanks."

Deviation: Provisions for tanks to be filled selectively shall not be required.

Reason for Change and Remarks: Fuel from tanks is used in a specific sequence for c.g. control, conversely tanks are filled in the reverse sequence.

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285 3.12.9.13 Refueling Provisions

Requirement: Paragraph 3.9 - "Fuel Shut-Off Provisions - For airplanes with provisions for ground refueling only, at least one of the shut-off devices shall be of the "fail closed" design.

15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENT

Deviation	Paragraph	Memo Report No. MCREXP-524-3006 (Cont)
285 (Cont)	3.12.9.13	Refueling Provisions (Cont)

Deviation: Provisions for "fail closed" control valve shall not be required.

Reason for Change and Remarks: The vent and fuel tank pressure relief systems are adequate to prevent excessive pressures in the wing if the shut-off or pilot valves fail.

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286	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.14 - "Tank-Filler Caps - The requirements for a pressure refueling system shall in no way delete existing requirements for normal tank filler caps."

Deviation: Gravity filling requirements shall not be incorporated.

Reason for Change and Remarks: Main fuel tanks may be filled by pressure refueling, (single point) only. This is as established through correspondence between CVAC and WADC. (Ref. Convair ltr 6-3490 of 2 July 1952.)

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AND 10064 Fittings - Installation of Flared Tube, Straight Threaded Connections, dated 16 May 1949
287	3.2.11	Standard Parts

Requirement: Installation as described by (AND 10064) is required by MIL-H-5440 and other system specifications. The installation requires one (1) washer placed between the body of the fitting and the bulkhead or bracket in which it is installed.

Deviation: It shall be permissible to use additional washers between the bulkhead or bracket and the AN 924 nut where specified on engineering drawings.

Reason for Change and Remarks: To prevent chafing of bulkhead or bracket surfaces when tightening the nut.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	ANA Bulletin 386 Recommended Guided for Location and Actuation of Pilot Controls, dated 15 November 1949.
288	3.19.2.3	Check-Off List
	Requirement:	Paragraph 2.1.1 - (a) Location - The landing check-off list will be located on the left and the take-off check list will be located on the right of the instrument panel or adjacent thereto.
		(b) Comments - A landing check-off list and a take-off check off list are primary requirements, etc. etc.
	Deviation:	(a) and (b) Landing and take-off check-off lists shall be combined in one unit and said unit shall be located as approved by Mock-Up Inspectors.

Reason for Change and Remarks: Approved by Mock-Up Board of 28-29 Sept. 1954.

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Deviation	Paragraph	
289	3.10.3	Trim Control
	Requirement:	Paragraph 2.1.6 - (a) Location - For electrically operated trim tabs - The trim tab control location shall be immediately aft of power control or on top of the aft portion of the control stick grip.
	Deviation:	Rudder trim switch shall be located on the utility switch panel which is located at centerline of airplane below main instrument panel.

Reason for Change and Remarks: To maintain F-102A arrangement.

* * * * *

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5 JAN 1955

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	ANA Bulletin 386 (Cont)
290	3.7.1.3.4	Emergency Canopy Release Control

Requirement: Paragraph 2.1.19 - (a) Location - The emergency canopy release control shall be operated by the normal canopy control.

(b) Actuation - The emergency or jettison position of the canopy control shall be aft of the open position of the canopy control, but the movement from normal canopy control open position to the emergency or jettison position shall be through a gate stop.

Deviation: (a) and (b) - The emergency canopy release control shall be separate from the normal canopy release control.

Reason for Change and Remarks: Approval by F-102A mock-up Board of 28-29 July 1954. Ref. RFA #66.

* * * *

Deviation	Paragraph	
291	3.19.2.2	Map Stowage

Requirement: Paragraph 2.9.7 - (a) Location - The map stowage location shall be on the right side.

Deviation: (a) Map stowage shall be between the two pilots.

Reason for Change and Remarks: For accessibility to each pilot. Approved by Mock-Up Board of 28-29 Sept. 1954.

* * * *

15 OCT 1954 5 JAN 1955

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	ANA Bulletin 386 (Cont)
292	3.20.1	Air Conditioning

Requirement: Paragraph 2.10.2 - (a) Location - The pressure cabin control lever and the temperature control switch shall be located on the right console forward.

(b) Actuation - The control motion for the pressure cabin control lever shall be forward for pressure cabin and aft for dump and ram air. The control for the temperature control switch shall be clockwise for increase.

Deviation: (a) The pressure cabin control shall be a switch in lieu of a lever and shall be located on the students left hand auxiliary panel forward of and above the left console. The temperature control switch shall be located on the utility switch panel which is located at centerline of students position below his instrument panel.

(b) The control motion for the pressure cabin control switch shall be up for pressure cabin and down for dump and ram air.

Reason for Change and Remarks: To maintain F-102A arrangement.

* * * *

Deviation	Paragraph	ANA Bulletin 386 (Cont)
293	3.7.1.3.4	Canopy Control

Requirement: Location - The canopy control shall be located on the left side forward and as high as possible.

Deviation: Canopy control handle to be in right lower corner of student's instrument panel, as shown in mock-up.

Reason for Change and Remarks: To maintain F-102A arrangement.

* * * *

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15 OCT 1954

[redacted]

APPENDIX III - A

The following details and assemblies shall be interchangeable within the definition of Specification AN-I-21

TF-102A INTERCHANGEABILITY LIST

1. Elevon assembly
2. Wing tip assembly
3. Wing leading edge assembly except stub assembly
4. Rudder assembly
5. Vertical stabilizer tip assembly
6. Vertical stabilizer leading dege except stub assembly
7. Fuselage tail cone assembly
8. Fuselage nose radome assembly
9. Speed brake assembly
10. Windshield and canopy transparent panel assemblies
11. Main landing gear assembly and removable components of main landing gear assembly
12. Nose landing gear assembly and removable components of nose landing gear assembly
13. Power plant installation (quick-change feature) (power plant assy)
14. Engine air intake ducts which are not integral with fuselage structure
15. Rocket and missile displacing gear mechanism (not missile bay doors)
16. Ejection seat assembly
17. Control stick assembly (stick and grip assembly - not including yoke arrangement)
18. Rudder and brake pedal assembly
19. Control system parts such as bellcranks, control arms, walking beams, push-pull rods, eccentric sheaves, shafts and similar related parts. (Except those that are required to be attached by taper pins or rivets, or where permissible tolerance dictates matched drilling or reaming.)
20. Temperature regulators
21. Pressure regulators
22. Intercoolers
23. Hydraulic and high pressure pneumatic system units (exclusive of tubing, tubing assemblies and tubing mounting parts)
24. Structural access doors (except those made of sheet metal capable of being trimmed to fit at installation with hand tools)
25. Provisions for mounting all GFAE
26. Instrument panel assembly
27. Cockpit console panels (individual panel assemblies on top of side and center consoles only)
28. Rocket packages

CONFIDE[redacted]

5 JAN 1955

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APPENDIX III-B

The following details and assemblies shall be replaceable within the definition of Specification AN-I-21.

TF-102A REPLACEABILITY LIST

	ITEM	REASON FOR NOT BEING INTERCHANGEABLE
1.	Wing Assembly	Match drilling required for wing-to-fuselage attach angle.
2.	Armament Bay Doors	Skin and hinge trim at installation
3.	Main Alighting Gear Closure Doors	Skin trim at installation
4.	Nose Alighting Gear Closure Doors	Skin trim at installation
5.	Fairings	
6.	Control horns, masts, brackets, bellcranks, control arms, walking beams, push-pull rods, eccentric sheaves, shafts and similar related parts that are required to be attached by taper pins or rivets, or where permissible tolerances dictate matched drilling or reaming.	
7.	Inspection doors unstressed.	Skin trim and drill at installation.
8.	Structural access doors made of sheet metal and capable of being trimmed at installation with hand tools	Interchangeable with respect to attach points, Skin trim at installation.
9.	Stub assembly - vertical stabilizer leading edge	Variation in attach holes. Match drilling required with respect to drag angle.
10.	Stub assembly - Wing Leading Edge	Variation in attach holes. Match drilling required with respect to drag angle.
11.	Fuselage Movable Canopy Assembly	Interchangeable with respect to contour, latches and hinge points. Skin trim at installation.

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51

TF-102

MODEL SPECIFICATION

FOR

CONVAIR MODEL 8

UNITED STATES AIR FORCE MODEL TF-102A

TRAINER FIGHTER AIRPLANE

CONTRACT AF33(600)-23903

* * * *

REPORT NO. ZD-8-004-A

DATED 15 NOVEMBER 1954

* * * *

SUPE

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Classification Changed to: UNCLASSIFIED
Authorized by B DD 254 Date: 6/10/60
Declassified by: FCB Dept 21 Date: 8/[illegible]/60

This document contains information affecting the National Defense of the United States within the meaning of the Espionage Laws, Title 18, U.S.C. Sections 793 and 794. The transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

By C. C. Priest
Specification Section

Approved W. W. Fox
Project Engineer

Checked W H Brown
Specification Section

Approved
fr Chief Engineer

~~CONFIDENTIAL~~

TABLE OF CONTENTS

1. SCOPE AND CLASSIFICATION 1

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS 2

3. REQUIREMENTS 3

3.1 CHARACTERISTICS 3
3.1.1 THREE VIEW DRAWING 3
3.1.2 PERFORMANCE 3
3.1.3 WEIGHTS 7
3.1.4 CENTER OF GRAVITY LOCATIONS 12
3.1.5 AREAS 14
3.1.6 DIMENSIONS AND GENERAL DATA 14
3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS 16

3.2 GENERAL 17
3.2.1 GENERAL INTERIOR ARRANGEMENT 17
3.2.2 MATERIALS 17
3.2.3 WORKMANSHIP 18
3.2.4 PRODUCTION, MAINTENANCE AND REPAIR 18
3.2.5 INTERCHANGEABILITY AND REPLACEABILITY 18
3.2.6 FINISH 18
3.2.7 IDENTIFICATION AND MARKING 18
3.2.8 EXTREME TEMPERATURE OPERATION 18
3.2.9 CLIMATIC REQUIREMENTS 19
3.2.10 LUBRICATION 19
3.2.11 STANDARD PARTS 19
3.2.12 CREW 19
3.2.13 EQUIPMENT INSTALLATION 20
3.2.13.1 ARMAMENT 20
3.2.13.2 COMMUNICATION AND NAVIGATION EQUIPMENT 20
3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION 20

3.3 AERODYNAMICS 21
3.3.1 GENERAL 21
3.3.2 STABILITY AND CONTROL 21

CONFIDENTIAL

TABLE OF CONTENTS

3.3.2.1 STABILITY AND CONTROLLABILITY. 21
3.3.2.2 PERMISSIBLE AERODYNAMICS CENTER OF GRAVITY LIMITS 21
3.3.2.3 SPEED BRAKE OPENING 21
3.3.2.4 LONGITUDINAL DECELERATION 21

3.4 STRUCTURAL DESIGN CRITERIA 22
3.4.1 LIMIT FLIGHT LOAD FACTORS 22
3.4.2 LIMIT GROUND LOAD FACTORS. 22
3.4.3 LIMIT DIVING SPEED. 22

3.5 WING GROUP. 25
3.5.1 DESCRIPTION AND COMPONENTS 25
3.5.2 CONSTRUCTION 25
3.5.3 ELEVONS 25
3.5.4 LIFT AND DRAG INCREASING DEVICES 25

3.6 TAIL GROUP. 26
3.6.1 DESCRIPTION AND COMPONENTS 26
3.6.2 STABILIZER 26
3.6.3 ELEVATOR 26
3.6.4 FIN 26
3.6.4.1 DROGUE PARACHUTE 26
3.6.5 RUDDER. 26

3.7 BODY GROUP 27
3.7.1 FUSELAGE. 27
3.7.1.1 DESCRIPTION 27
3.7.1.2 CONSTRUCTION 27
3.7.1.3 CREW AND PERSONNEL STATIONS 27
3.7.1.4 CARGO COMPARTMENTS 28
3.7.1.5 EQUIPMENT COMPARTMENTS 28
3.7.1.6 SPEED BRAKES 28
3.7.1.7 ROCKET AND MISSILE BAYS 28
3.7.1.8 WHEEL WELLS. 28
3.7.1.9 ACCESSORY COMPARTMENT 28
3.7.2 HULL 28

CONFIDENTIAL

TABLE OF CONTENTS

3.8 ALIGHTING GEAR. 29
3.8.1 GENERAL DESCRIPTION 29
3.8.2 MAIN LANDING GEAR. 29
3.8.2.1 DESCRIPTION 29
3.8.2.2 WHEELS, BRAKES AND BRAKE CONTROL SYSTEMS. . . . 29
3.8.2.3 TIRES AND TUBES 29
3.8.2.4 SHOCK ABSORBERS. 29
3.8.2.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS . . . 29
3.8.2.6 DOORS AND FAIRINGS. 29
3.8.2.7 INSPECTION AND MAINTENANCE 30
3.8.3 AUXILIARY LANDING GEAR (Tail Wheel) 30
3.8.4 AUXILIARY LANDING GEAR (Nose Wheel). 30
3.8.4.1 DESCRIPTION 30
3.8.4.2 WHEEL 30
3.8.4.3 TIRE AND TUBE 30
3.8.4.4 SHOCK ABSORBER 30
3.8.4.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS . . . 30
3.8.4.6 DOORS AND FAIRINGS. 30
3.8.4.7 STEERING CONTROL 30
3.8.4.8 INSPECTION AND MAINTENANCE 31
3.8.5 IN-FLIGHT OPERATING CONDITIONS. 31

3.9 ALIGHTING GEAR (Water Type) 31

3.10 SURFACE CONTROL SYSTEM 32
3.10.1 PRIMARY FLIGHT CONTROL SYSTEM 32
3.10.1.1 FLIGHT STATION CONTROLS 32
3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS 32
3.10.2.1 LIFT AND DRAG INCREASING DEVICE SYSTEMS 32
3.10.2.2 SPEED BRAKES 32
3.10.3 TRIM CONTROL SYSTEMS 32
3.10.4 AUTOMATIC FLIGHT CONTROL DEVICES 33
3.10.4.1 PITCH AND YAW DAMPER SYSTEM 33
3.10.4.2 PILOT ASSIST SYSTEM 33
3.10.4.3 PITCH G-LIMITER 33
3.10.4.4 AUTOMATIC FLIGHT CONTROL SYSTEM 33
3.10.5 MODES OF FLIGHT CONTROL 33
3.10.5.1 DIRECT MANUAL. 33

CONFIDENTIAL

TABLE OF CONTENTS

3.10.5.2 MANUAL 34
3.10.5.3 PILOT ASSIST. 34
3.10.5.4 AUTOMATIC FIRE CONTROL 34

3.11 ENGINE SECTION. 35
3.11.1 DESCRIPTION AND COMPONENTS 35
3.11.2 CONSTRUCTION 35
3.11.3 ENGINE MOUNTS 35
3.11.4 VIBRATION ISOLATORS 35
3.11.5 FIREWALLS 35
3.11.6 COWLING AND COWL FLAPS 35
3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE 35
3.11.8 FIRE ACCESS DOORS 35

3.12 PROPULSION. 36
3.12.1 GENERAL DESCRIPTION AND COMPONENTS 36
3.12.2 MAIN PROPULSION UNIT 36
3.12.3 AUXILIARY PROPULSION UNIT 36
3.12.4 ENGINE-DRIVEN ACCESSORIES 36
3.12.5 AIR INDUCTION SYSTEM 36
3.12.6 EXHAUST SYSTEM 36
3.12.7 COOLING SYSTEM 36
3.12.8 LUBRICATING SYSTEM 37
3.12.8.1 DESCRIPTION AND COMPONENTS 37
3.12.9 FUEL SYSTEM 37
3.12.9.1 DESCRIPTION AND COMPONENTS 37
3.12.9.2 PUMPS. 37
3.12.9.3 TANKS (Fixed) 37
3.12.9.4 TANKS (Jettisonable) 38
3.12.9.5 VENT SYSTEM 38
3.12.9.6 PIPING AND FITTINGS 38
3.12.9.7 VALVES 38
3.12.9.8 STRAINERS AND FILTERS. 38
3.12.9.9 QUANTITY GAGES AND FLOWMETERS 38
3.12.9.10 DRAINAGE PROVISIONS 39
3.12.9.11 FUEL EVAPORATION AND TRANSFER CONTROL 39
3.12.9.12 REFUELING PROVISIONS 39
3.12.9.13 DEFUELING PROVISIONS 39

CONFIDENTIAL

TABLE OF CONTENTS

3.12.10 WATER INJECTION SYSTEM 39
3.12.11 PROPULSION SYSTEM CONTROLS 39
3.12.12 STARTING SYSTEM 39
3.12.13 PROPELLER 39
3.12.14 ROCKET PROPULSION SYSTEM 39

3.13 AUXILIARY POWER PLANT 40

3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT 41
3.14.1 INSTRUMENTS 41
3.14.1.1 STUDENT INSTRUMENTS 41
3.14.1.2 INSTRUCTORS INSTRUMENTS 41
3.14.2 NAVIGATION EQUIPMENT 42
3.14.3 INSTALLATION 42

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS 43
3.15.1 HYDRAULIC SYSTEM 43
3.15.1.1 DESCRIPTION AND COMPONENTS 43
3.15.1.2 SUMMARY OF ACTUATED ITEMS 44
3.15.2 PNEUMATIC SYSTEMS 44
3.15.2.1 LOW PRESSURE PNEUMATIC SYSTEM 44
3.15.2.2 HIGH PRESSURE PNEUMATIC SYSTEM 44

3.16 ELECTRICAL 46
3.16.1 DESCRIPTION 46
3.16.2 ELECTRICAL POWER SUPPLY 46
3.16.2.1 DIRECT CURRENT 46
3.16.2.2 ALTERNATING CURRENT 46
3.16.3 ELECTRICAL POWER CONVERSION 47
3.16.3.1 INSTRUMENT POWER 47
3.16.3.2 EMERGENCY POWER 47
3.16.4 EQUIPMENT INSTALLATION 47
3.16.5 WIRING 47
3.16.6 BONDING 47
3.16.7 CONTROLS 48
3.16.7.1 POWER CONTROL 48
3.16.8 LIGHTING 48
3.16.8.1 GENERAL 48
3.16.8.2 INTERIOR 48

CONFIDENTIAL

TABLE OF CONTENTS

3.16.8.3 EXTERIOR 49
3.16.9 IGNITION AND STARTING CONTROL SYSTEM 49
3.16.10 RECEPTACLES 49
3.16.10.1 EXTERNAL POWER 49
3.16.10.2 ELECTRICAL CONNECTORS 49
3.16.10.3 FUEL NOZZLE GROUNDING JACK 49
3.16.10.4 STATIC GROUND 50
3.16.11 INDICATORS 50
3.16.11.1 ALARMS 50
3.16.11.2 SIGNAL ASSEMBLIES 50
3.16.11.3 WARNING LIGHTS 50
3.16.11.4 METERS 51
3.16.12 ELECTRIC DRIVES 51
3.16.13 RELAYS 51
3.16.14 BOOSTER COIL 51
3.16.15 FILTERS 51
3.16.16 LOAD ANALYSIS 51

3.17 ELECTRONICS 52
3.17.1 EQUIPMENT 52
3.17.1.1 CONTROL PANEL 53
3.17.1.2 ANTENNAS 54
3.17.1.3 INTERFERENCE 54
3.17.1.4 WIRING 54
3.17.1.5 COOLING 55
3.17.2 COMMUNICATIONS EQUIPMENT 55
3.17.2.1 COMMAND SET AN/ARC - 34 55
3.17.2.2 LIAISON SET 55
3.17.2.3 INTERPHONE 55
3.17.2.4 MICROPHONE AND HEADSETS 55
3.17.2.5 FILTER EQUIPMENT 55
3.17.2.6 RECORDING EQUIPMENT 55
3.17.3 NAVIGATION EQUIPMENT 55
3.17.3.1 RADIO COMPASS 55
3.17.3.2 MARKER BEACON EQUIPMENT 56
3.17.3.3 INSTRUMENT APPROACH EQUIPMENT 56

CONFIDENTIAL

TABLE OF CONTENTS

3.17.3.4 ALTIMETER - RADIO 56
3.17.3.5 RADIO RANGE RECEIVER 56
3.17.3.6 HOMING ADAPTER AN/ARA - 25 56
3.17.3.7 VHF NAVIGATION RECEIVER AN/ARN - 14 57
3.17.3.8 DISTANCE MEASURING EQUIPMENT AN/ARN-21 . . 57
3.17.3.9 ARBITRARY COURSE COMPUTER 57
3.17.4 RADAR 57
3.17.4.1 SEARCH EQUIPMENT 57
3.17.4.2 LORAN EQUIPMENT 57
3.17.4.3 AUTOMATIC GROUND POSITION INDICATING EQUIPMENT 57
3.17.4.4 IDENTIFICATION EQUIPMENT 58
3.17.4.5 INTERROGATION EQUIPMENT 59
3.17.4.6 RADAR BEACON 59
3.17.4.7 FIRE CONTROL SYSTEM 59
3.17.5 ELECTRONIC COUNTERMEASURE 60
3.17.6 ELECTRONIC GUIDANCE SYSTEM 60
3.17.6.1 GUIDE LINKS AND SYSTEMS 60
3.17.6.2 ANTENNA - DATA LINK 60
3.17.7 STATIC DISCHARGERS 60
3.17.8 EMERGENCY RESCUE TRANSMITTER 60
3.17.9 RADOME 60
3.17.10 GROUND TEST EQUIPMENT OUTLETS 60

3.18 ARMAMENT 61
3.18.1 DESCRIPTION 61
3.18.2 FIXED GUNS 61
3.18.3 ROCKETS AND MISSILES 61
3.18.3.1 DESCRIPTION 61
3.18.3.2 ROCKET LAUNCHER 61
3.18.3.3 MISSILE LAUNCHER 61
3.18.3.4 ALIGNMENT 62
3.18.3.5 ARMAMENT CONTROLS 62
3.18.3.6 EXTENSION AND RETRACTION TIME 62
3.18.4 FLEXIBLE GUNS 63
3.18.5 STORES 63

TABLE OF CONTENTS

3.18.6 PASSIVE DEFENSE 63
3.18.7 BORE SIGHTING 63

3.19 FURNISHINGS AND EQUIPMENT 64
3.19.1 ACCOMMODATIONS FOR PERSONNEL 64
3.19.2 MISCELLANEOUS EQUIPMENT 64
3.19.3 FURNISHINGS 65
3.19.4 EMERGENCY EQUIPMENT 65
3.19.5 OXYGEN EQUIPMENT 65
3.19.6 EMERGENCY RESCUE EQUIPMENT 65
3.19.7 SPARE BULBS 65

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT. . 66
3.20.1 AIR CONDITIONING 66
3.20.1.1 IN-FLIGHT AIR CONDITIONING 66
3.20.1.2 GROUND AIR CONDITIONING 67
3.20.2 ANTI-ICING 68
3.20.2.1 ANTI-ICING OF NONTRANSPARENT AREAS 68
3.20.2.2 ANTI-ICING, DEFROSTING AND DEFOGGING OF TRANSPARENT AREAS 68

3.21 PHOTOGRAPHIC 68

3.22 AUXILIARY GEAR 70
3.22.1 TOWING PROVISIONS 70
3.22.1.1 MAIN LANDING GEAR 70
3.22.1.2 NOSE LANDING GEAR 70
3.22.2 JACKING PROVISIONS 70
3.22.3 MOORING PROVISIONS 70
3.22.4 HOISTING PROVISIONS 70
3.22.5 LEVELING 70
3.22.6 COVERS AND SHIELDS 71
3.22.7 SPECIAL GROUND SUPPORT EQUIPMENT 71

CONFIDENTIAL

TABLE OF CONTENTS

4. SAMPLING, INSPECTION AND TEST PROCEDURES 72

5. PREPARATION FOR DELIVERY 72

6. NOTES 73

6.1 EXPLANATORY INFORMATION 73
6.2 ADDITIONAL INFORMATION 73
6.3 DEFINITIONS 73
6.3.1 COMPLETE PROVISION FOR 73
6.3.2 STRUCTURAL PROVISIONS FOR 73
6.3.3 SPACE PROVISIONS FOR 73
6.3.4 SPACE AND WEIGHT PROVISIONS 73
6.3.5 OTHER DEFINITIONS 74

APPENDIX I-A GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT CONTRACTOR INSTALLED 75

APPENDIX I-B GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT GOVERNMENT INSTALLED 82

APPENDIX I-C CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT CONTRACTOR INSTALLED 83

APPENDIX I-D SPECIAL EQUIPMENT - CONTRACTOR FURNISHED . 89

APPENDIX II DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS 90

APPENDIX III-A INTERCHANGEABILITY LIST 280

APPENDIX III-B REPLACEABILITY LIST 281

CONFIDENTIAL

TABLE OF CONTENTS

ILLUSTRATIONS

Figure 1 THREE VIEW DRAWING 4
Figure 2 PERFORMANCE SUMMARY 6
Figure 3 CENTER OF GRAVITY CHART 13
Figure 4 LIMIT DIVE SPEED 23
Table 1 SUMMARY OF DESIGN FLIGHT CONDITIONS 24
Figure 5 CABIN PRESSURIZATION SCHEDULE 69

The following Request for Alteration (RFA), submitted at TF-102A Nose Section Mock-Up Inspection conducted 28-29 September 1954 at Fort Worth Division of Convair, have been accomplished and are incorporated in this issue of this Model Specification by reference:

RFA No.	Subject
1	Canopy Handles
3	Instrument Panel
4	Fire Warning Indicator
8	Nose Wheel
9	Ejection Seat Handles
10	Radar Control Knob
12	Oxygen Regulator
13	Ejection Clearance
14	Drag Chute Handles
15	Canopy Ejection Knob
17	Radar Scope Shielding
18	Pilot Assist Panel and Communication Panel
20	Pilots' Seats and False Cockpit Floor
30	Overheat Light (Windshield Side Panels)
31	Rain Removal Switch
34	Magnetic Compass Power System
35	Standby Compass Mounting
36	Standby Compass Illumination Switch
37	IFF Control Panel
38	External Canopy Locks
39	A.C. Voltmeter Selector Switch Panel
41	Rudder Pedals
43	Obstruction to AN/ARC-34 Control Panel
45	Edge Lighted Inst. Panel

1. SCOPE AND CLASSIFICATION:

1.1 This specification covers the following airplane:

Service Model Designation	TF-102A
Consolidated Vultee Aircraft Corporation Model	8
Number and Places for Crew	Two
Number and Kind of Engine	One Turbo-jet

1.1.1 The primary mission of this airplane is the training of pilots, under all weather conditions and visibility, for the USAF Model F-102 Interceptor Fighter, as well as for other jet propelled, delta wing aircraft.

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 2

DATE 4 April 1957

CHANGE (ECP) NO. 1223R1

MODEL TF-102A

REVISED 18 October 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Afterburner Recirculating Igniter Valve - Revision of. Pratt and Whitney ECP 69213C. CCN 8N-1753(150)

CHANGE

2.2 The applicable requirements of the following publications with dates as listed below form a part of this specification:

FROM: Pratt and Whitney Engine Specification No. A-1686 dated 4 February 1954.

TO: Pratt and Whitney Engine Specification No. A-1686 dated 4 February 1954.

(Effective on A/C Ser. Nos. 54-1351 thru 56-2331)

Pratt and Whitney Engine Specification No. A-1686-F, Amendment I, dated 21 January 1957.

(Effective on A/C Ser. Nos. 56-2332 thru 56-2379)

Effect on Weight:	+ 2.0 lbs.
Effect on Balance:	+1100.0 in. lbs.
Effect on Performance:	Will be accumulated with that of other changes and reported at a later date.

AIRPLANES AFFECTED:

BY W.H. Young

APPROVED BY P.A. Carlson 4/1

FORM 618C

2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS:

2.1 Applicable specifications listed in the Index of Specifications and Bulletins Approved for Air Force Procurement, dated 1 July 1950, including Supplements through 1 September 1950, shall form a part of this specification.

2.2 ⑧③ The applicable requirements of the following publications with dates as listed below form a part of this specification:

Air Force Specification No. R-1800-E, dated 18 May 1944 and Amendment No. 5 dated 28 May 1945.

Handbook of Instructions for Aircraft Designers Ninth Edition, including revision up to and including 1 April 1950.

Pratt and Whitney Engine Specification No. A-1686 dated 4 February 1954.

2.3 All other applicable specifications and drawings referenced herein, (but not by revision letter, date or amendment), shall be of the issue in effect on 1 September 1950.

3. REQUIREMENTS:

3.1 CHARACTERISTICS:

3.1.1 THREE VIEW DRAWING: (See Page 4).

3.1.2 PERFORMANCE: For estimated performance see Paragraph 3.1.2.1 (page 5) and Performance Summary (page 6).

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 4

DATE 24 January 1955

CHANGE (ECP) NO. 1010R$_1$

MODEL TF-102A

REVISED 21 July 1955

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor request. To improve Landing and Take-off Characteristics. Supp. Agr. #21, CCN #7N-1599(47)

CHANGE

3.1.1 Delete 3 View Drawing and Replace with the attached corrected information.

AIRPLANES AFFECTED: All

BY W. A. Young Jr.

APPROVED BY B. Applegate

FORM 618C

8.1.1 THREE VIEW

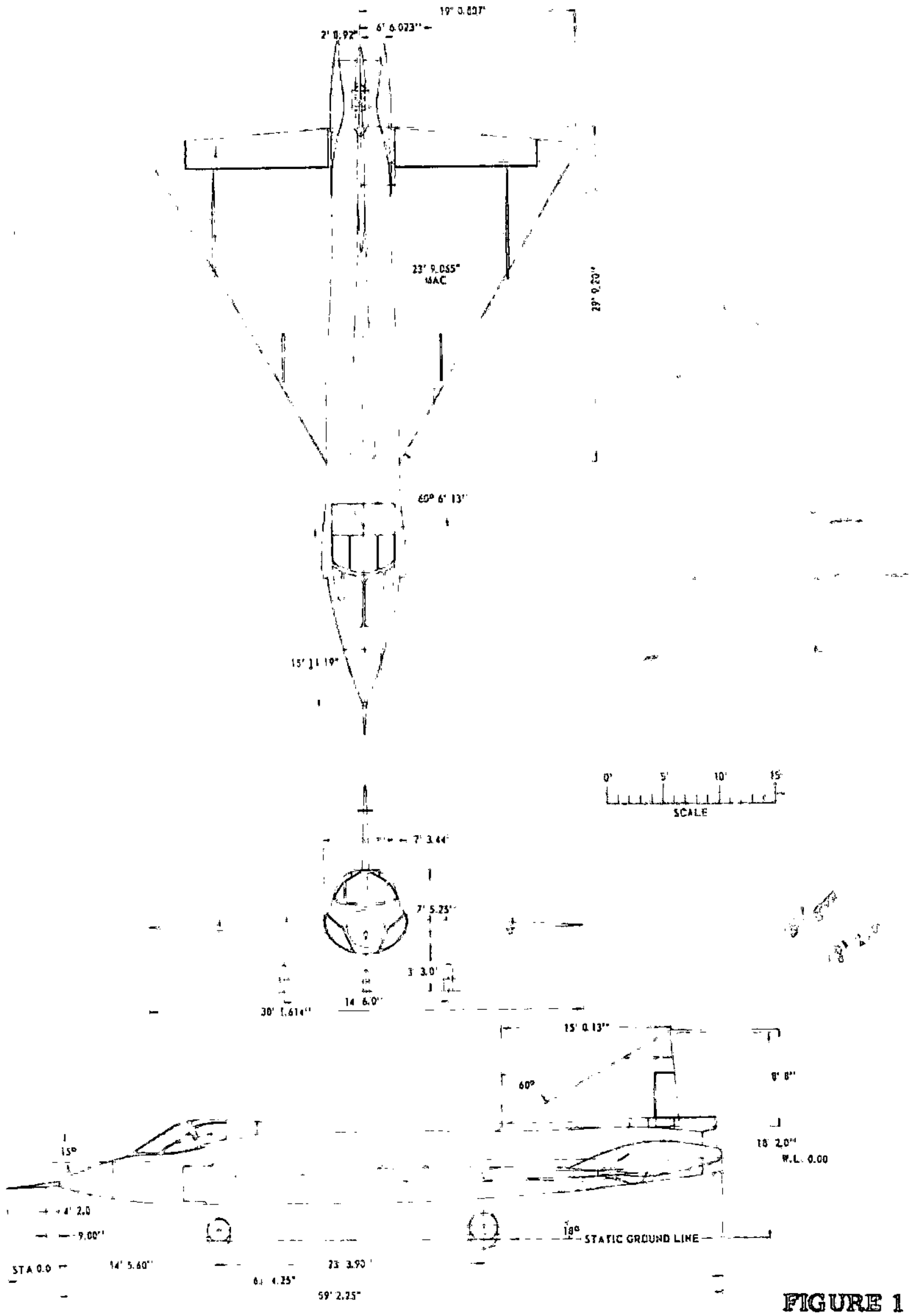

FIGURE 1

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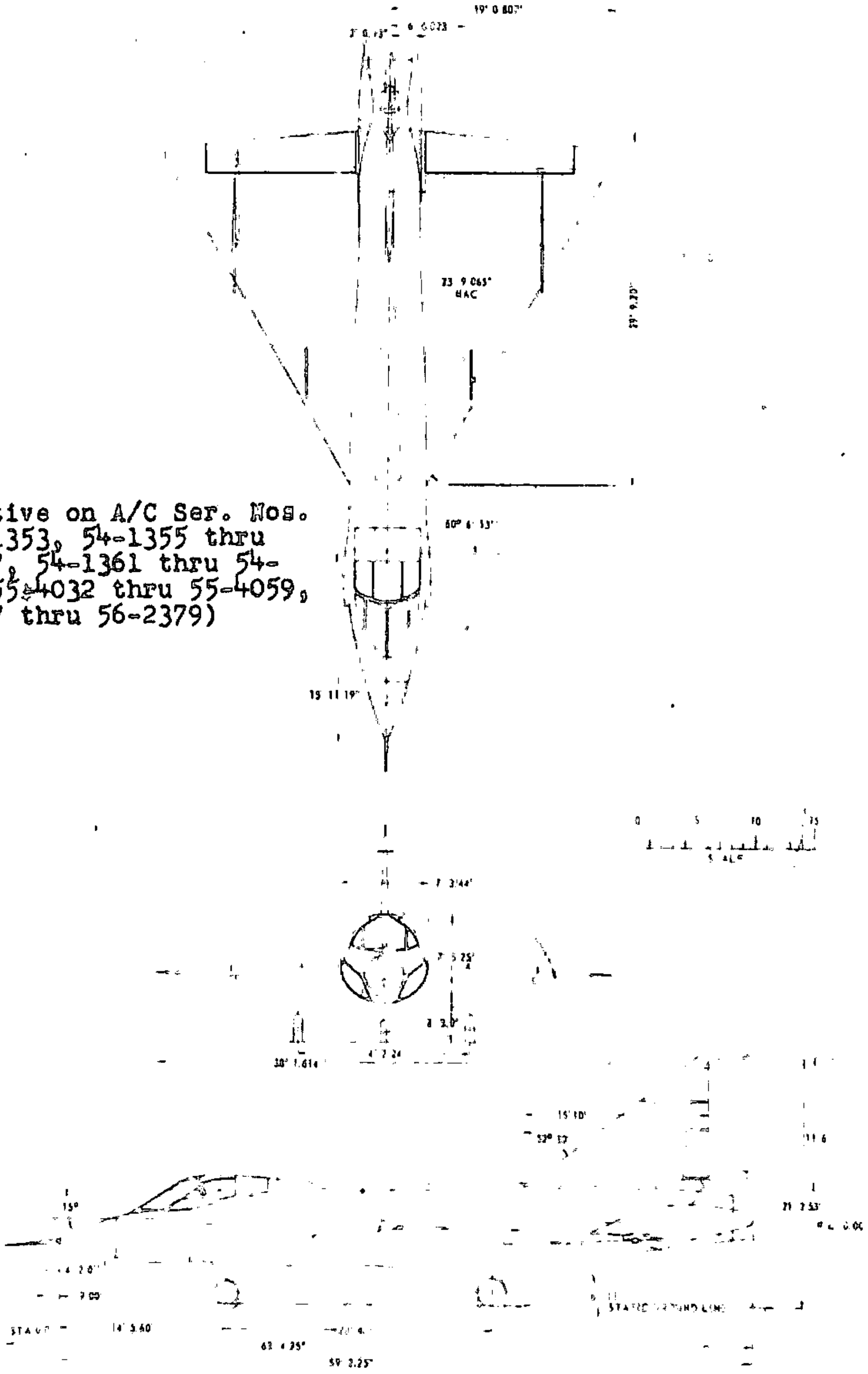

(Effective on A/C Ser. Nos. AF 54-1353, 54-1355 thru 54-1357, 54-1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

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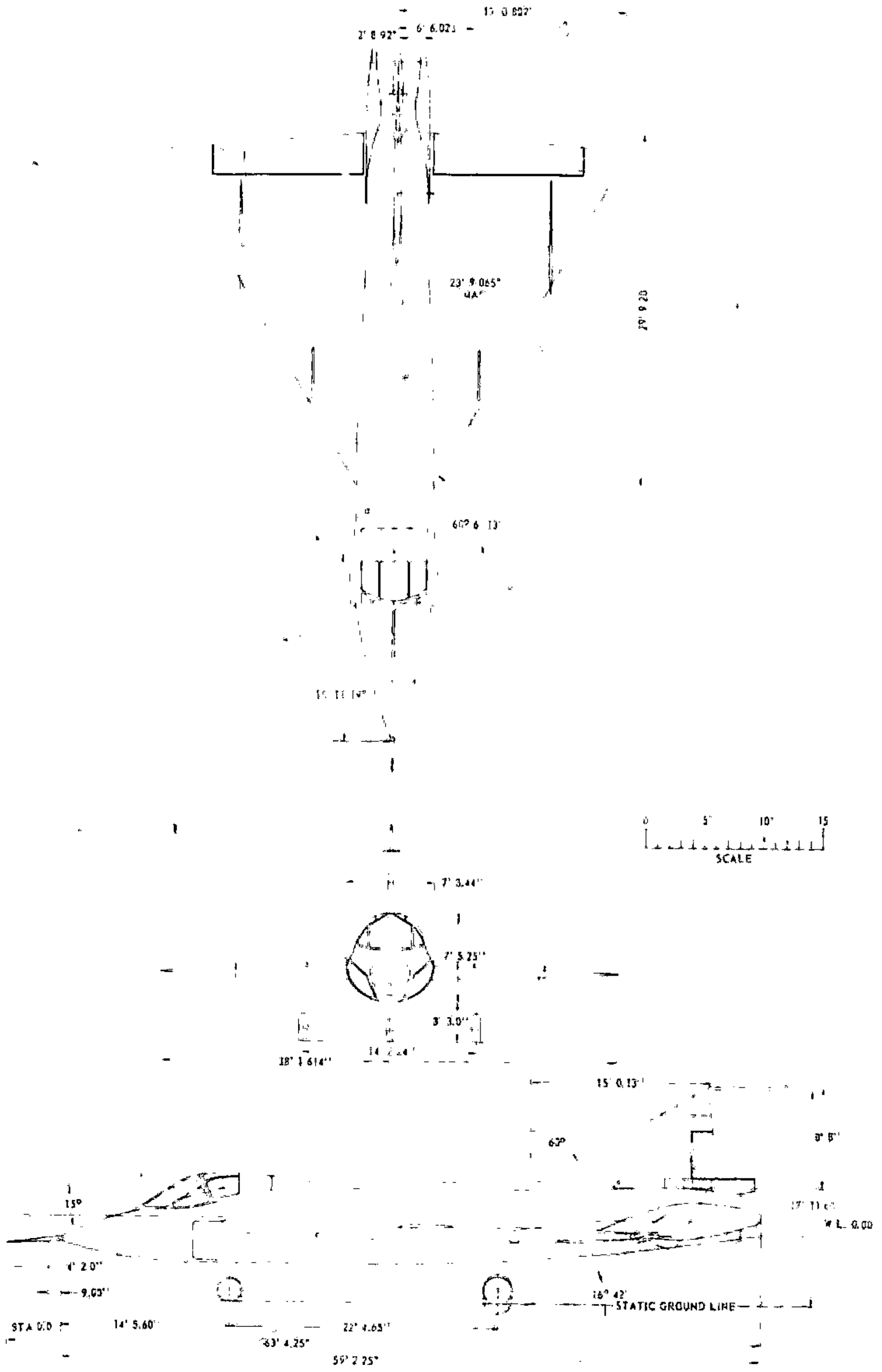

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 5 DATE 4 April 1957

CHANGE (ECP) NO. 1223R$_1$ MODEL TF-102A REVISED 18 October 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Afterburner Recirculating Igniter Valve - Revision of. Pratt and Whitney ECP 69123C. CCN 8N-1753(150)

CHANGE

3.1.2.1 ESTIMATED-TABULATED PERFORMANCE:

FROM:

Pratt and Whitney
J57-P-23

TO:

Pratt and Whitney
J57-P-23
(Effective on A/C Ser. Nos. 54-1351 thru 56-2331)

Pratt and Whitney
J57-P-23A
(Effective on A/C Ser. Nos. 56-2332 thru 56-2379)

AIRPLANES AFFECTED:

BY W. A. Young

APPROVED BY P P Carlson

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 5

DATE 24 July 1956

CHANGE (ECP) NO. 529 **MODEL** TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC wire MCPHFC(RDZSFG) 1622 dated 10 April 1956. Vertical Tail - Change to. Reference ECP 1131. CCN #117 MSN 7N-5263 dtd 13 Feb. 1957; CCN #91 MSN 7N-5264, dtd 28 Feb. 1957; CCN #69 MSN 7N-5265, dtd 28 Feb. 1957.

CHANGE

3.1.2.1 ESTIMATED - TABULATED PERFORMANCE:

		Pratt and Whitney J-57-P-23
FROM:		
Combat Ceiling with Military plus Afterburner Power (500 ft/min rate of climb)	ft.	48,800
Combat Radius - Area Intercept Mission per MIL-C-5011A (Combat 5 min. at max. power)	Nau Mi	281
TO:		
Combat Ceiling with Military plus Afterburner Power (500 ft/min rate of climb)	ft.	48,800
Combat Radius - Area Intercept Mission per MIL-C-5011A (Combat 5 min. max. power)	Nau Mi	281

(Effective on A/C Ser. Nos. AF54-1351, 54-1352, 54-1354, 54-1358 thru 54-1360)

Combat Ceiling with Military plus Afterburner Power (500 ft/min rate of climb)	ft.	48,610
Combat Radius - Area Intercept Mission per MIL-C-5011A (combat 5 min. max. power)	Nau Mi	275

(Effective on A/C Ser. Nos. AF54-1353, 54-1355 thru 54-1357, 54-1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

Effect on Weight:	+ 340.0 lb.
Effect on Balance:	+162924 in. lb.
Effect on Performance:	Ceiling decrease of 190 ft. No speed change at 35,000 ft.

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

CONFIDENTIAL

3.1.2.1 ESTIMATED-TABULATED PERFORMANCE

		Pratt and Whitney J57-P-23
Rated Static Thrust at Sea Level	Lb	16,000
Take-Off Weight (full load)	Lb	29,395
Combat Weight*	Lb	26,575
Landing Weight**	Lb	23,435
Fuel (1050 Gal.)	Lb	6,825
High Speed with Military plus Afterburner Power		
35,000 feet	Mach No.	1.0
45,000 feet	Mach No.	0.95
Combat Ceiling with Military plus Afterburner Power (500 ft/min rate of climb)	Ft	47,000
Time to Climb to Altitude with Military plus Afterburner Power (from start of take-off run)		
40,000 feet	Min	5.7
45,000 feet	Min	7.7
Take-Off Without Auxiliary Devices Over 50-Foot Obstacle with Military plus Afterburner Power Take-Off Weight	Ft	3,600
Land Over 50-Foot Obstacles (Landing Weight)		
Without Auxiliary Landing Devices	Ft	4,570
With 14-foot Diameter Drogue Chute	Ft	3,830
Interceptor Mission Performance		
Combat Radius - Area Intercept Mission per MIL-C-5011A (combat 5 min at max power)	Nau Mi	300
Loiter Time - Point Intercept Mission per MIL-C-5011A (combat 5 min at max power)	Hr	1.07

* Weight at start of combat for Point Intercept Mission

** Landing Weight corresponding to Point Intercept Mission. Includes full armament and 20 min reserve fuel at sea level (at V for max endurance)

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NOTE: The above performance is without external fuel tanks installed.

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 5a

DATE 4 April 1957

CHANGE (ECP) NO. $1223R_1$

MODEL TF-102A

REVISED 18 October 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Afterburner Recirculating Igniter Valve - Revision of. Pratt and Whitney ECP 69123C. CCN 8N-1753(150)

CHANGE

3.1.2.1 ESTIMATED-TABULATED PERFORMANCE:
(CASE XX CAMBER INSTALLATION)

FROM:

Pratt and Whitney
J57-P-23

TO:

Pratt and Whitney
J57-P-23
(Effective on A/C Ser. Nos. 54-1351 thru 56-2331)

Pratt and Whitney
J57-P-23A
(Effective on A/C Ser. Nos. 56-2332 thru 56-2379)

AIRPLANES AFFECTED:

BY W. A. Young Jr.

APPROVED BY [illegible] 4/11

FORM 618C

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 5a **DATE** 17 August 1956

CHANGE (ECP) NO. 543 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Case XX Camber Leading Edge - Change to. CCN #25 MSN 7N-1735, dtd 12 Sept. 1956.

CHANGE

3.1.2.1

ADD:

GUARANTEED PERFORMANCE (CASE XX CAMBER INSTALLATION):

a. The following performance is guaranteed within the tolerances noted:

1. Increase in absolute ceiling with Military plus afterburner power at take-off gross weight (Design Useful Load) less 40% fuel .... 2200 ft (± 500 ft)

The above performance figures are based upon engine thrust and fuel consumption data of Pratt & Whitney Specification No. A-1686, dated 4 February 1954, and without external fuel tanks installed.

(NOTE: The above performance is Effective on A/C Ser. Nos. 56-2336 thru 56-2379 only.)

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

CONFIDENTIAL

3.1.2.1

ESTIMATED-TABULATED PERFORMANCE
(CASE XX CAMBER INSTALLATION)

		Pratt and Whitney J57-P-23
Rated Static Thrust at Sea Level	Lb	16,000
Take-Off Weight (full load)	Lb	28,957
Combat Weight*	Lb	26,260
Landing Weight**	Lb	22,870
Fuel (1050 Gal.)	Lb	6,825
High Speed with Military plus Afterburner Power		
35,000 feet	Mach No.	0.90
45,000 feet	Mach No.	0.97
Combat Ceiling with Military plus Afterburner Power (500 ft/min rate of climb)	Ft	50,700
Time to Climb to Altitude with Military plus Afterburner Power (from start of take-off run)		
40,000	Min	4.6
45,000	Min	5.7
Take-Off Without Auxiliary Devices Over 50-Foot Obstacle with Military plus Afterburner Power (Take-Off Weight)	Ft	3,900
Land Over 50-Foot Obstacles (Landing Weight)		
Without Auxiliary Landing Devices	Ft	4,300
With 14-foot Diameter Drogue Chute	Ft	3,600
Interceptor Mission Performance		
Combat Radius - Area Intercept Mission per MIL-C-5011A (combat 5 min at max power)	Nau Mi	353
Loiter Time - Point Intercept Mission per MIL-C-5011A (combat 5 min at max power)	Hr.	1.3

* Weight at start of combat for Point Intercept Mission

** Landing Weight corresponding to Point Intercept Mission. Includes full armament and 20 min reserve fuel at sea level (at V for max endurance)

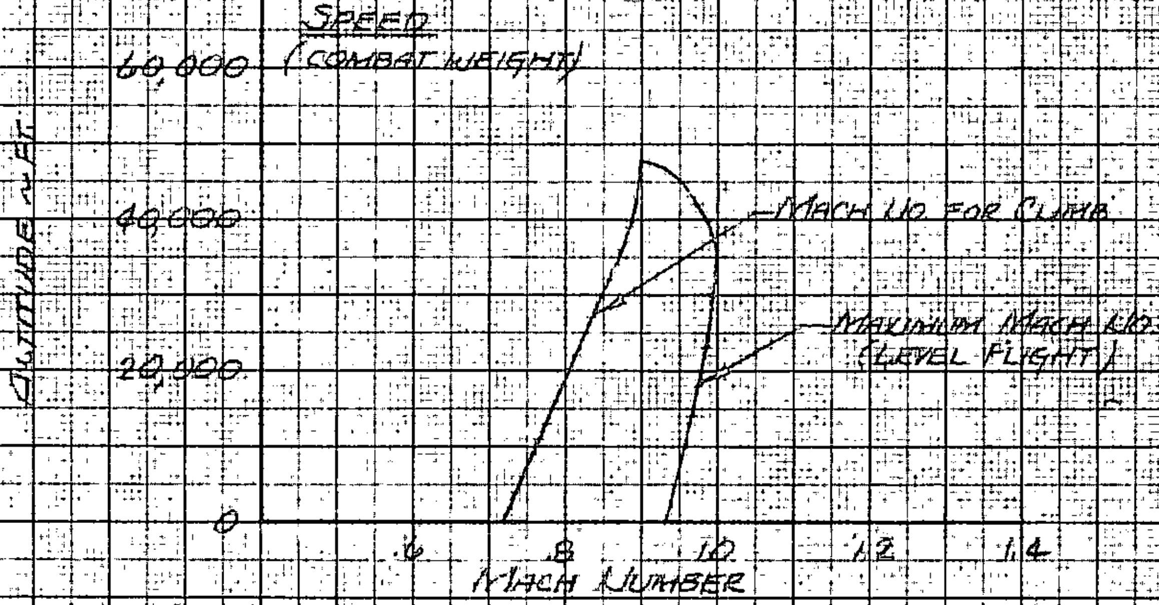
NOTE: The above performance is without external fuel tanks installed.

CONFIDENTIAL

(NOTE: The above performance is effective on A/C Ser. Nos. 56-2336 thru 56-2379 only)

TF - 102 AIRPLANE - PERFORMANCE SUMMARY

(MILITARY AFTERBURNER POWER)



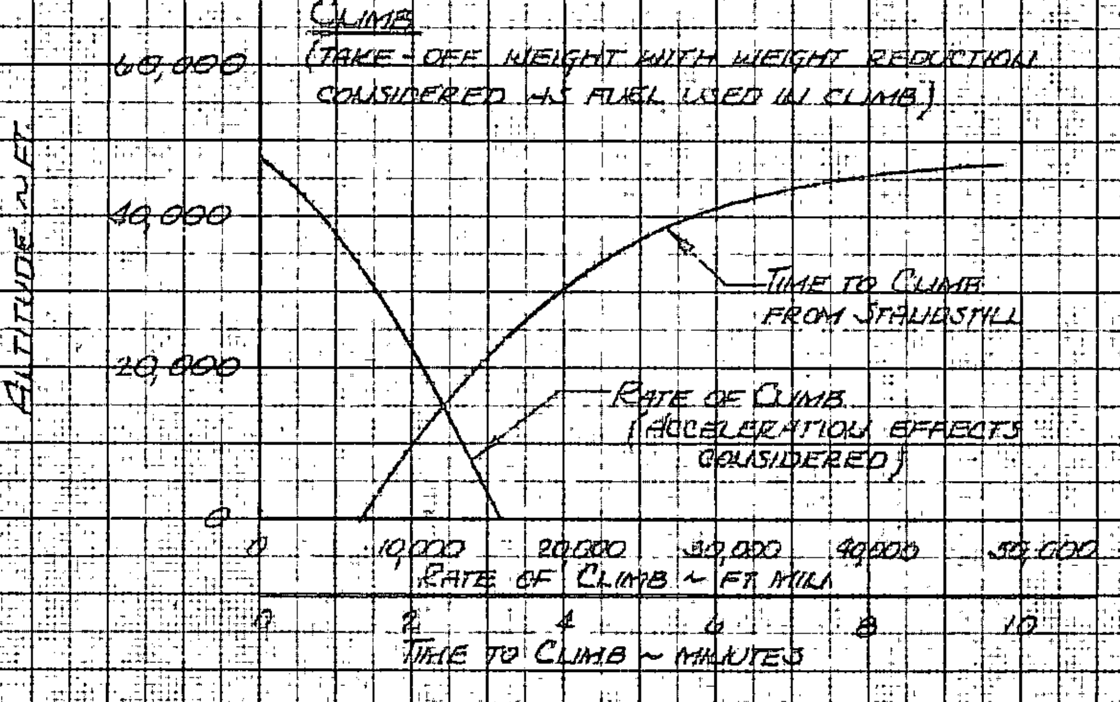
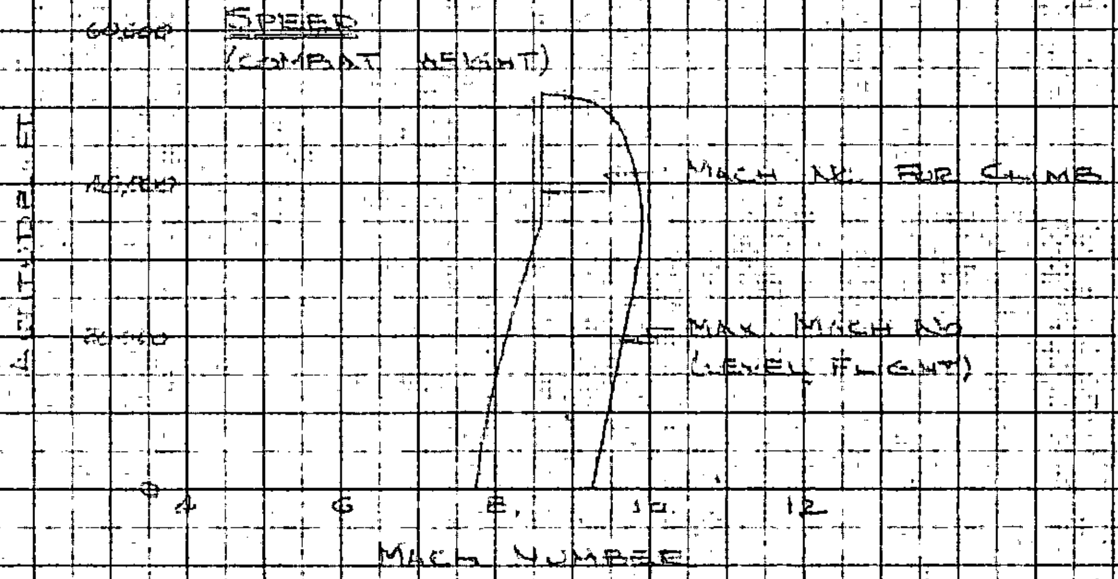
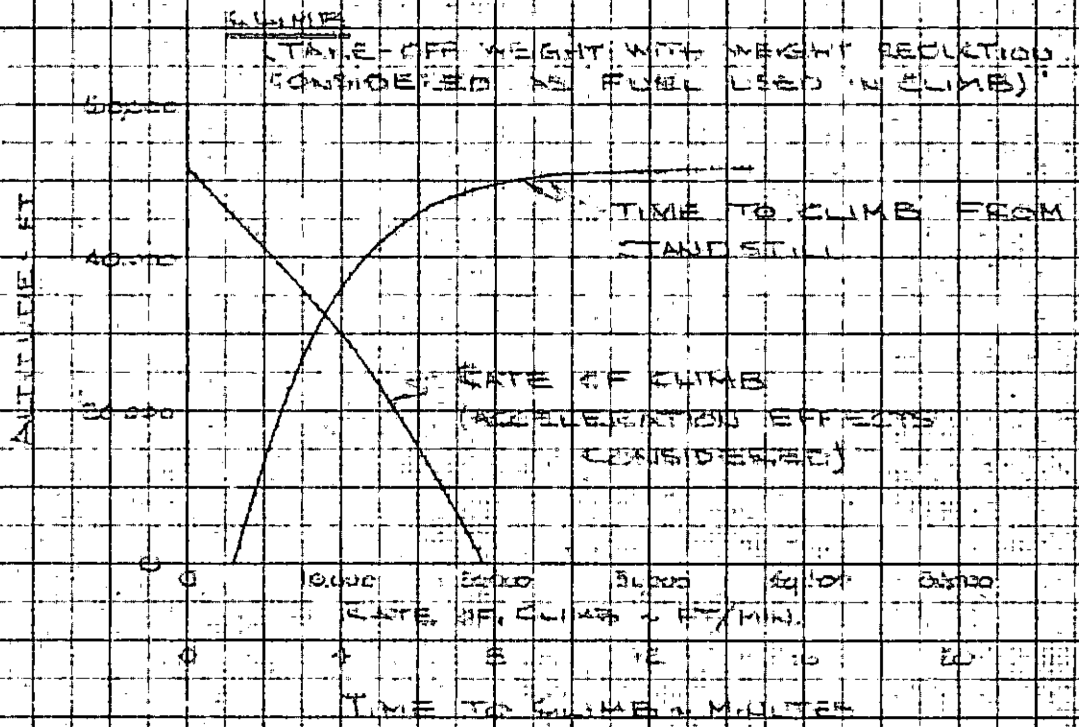


FIGURE 2

TF - 102A AIRPLANE - PERFORMANCE SUMMARY
(CASE XX CAMBER INSTALLATION)

(MILITARY+AFTERBURNER POWER)





(NOTE: The above performance summary is effective on A/C Ser. Nos. 5 -2336 thru 5 -2379 only.)

CONFIDENTIAL

3.1.3 WEIGHTS: For estimated weights see Group Weight Statement - AN9103-D on Pages 8 thru 11. For weight and balance purposes the aircraft is designated as Class 1B as defined in Specification AN-W-11b.

CONFIDENTIAL

AN-9103-D
NAME
DATE

GROUP WEIGHT STATEMENT
WEIGHT EMPTY

PAGE 8
MODEL TF-102A
REPORT ZD-8-004

CONFIDENTIAL

1	WING GROUP					3,197
2	CENTER SECTION - BASIC STRUCTURE				2,731	
3	INTERMEDIATE PANEL - BASIC STRUCTURE					
4	OUTER PANEL - BASIC STRUCTURE (INCL. TIPS LBS.)					
5	Elevons				385	
6	SECONDARY STRUCTURE ~~(INCL. WINGFOLD MECHANISM LBS.)~~				81	
7	AILERONS (INCL. BALANCE WEIGHT LBS.)					
8	FLAPS - TRAILING EDGE					
9	- LEADING EDGE					
10	SLATS					
11	SPOILERS					
12	SPEED BRAKES					
13						
14						
15	TAIL GROUP					377
16	STABILIZER - BASIC STRUCTURE					
17	FINS - BASIC STRUCTURE ~~(INCL. DORSAL LBS.)~~				332.0	
18	SECONDARY STRUCTURE ~~(STAB. &~~ FINS)				10.0	
19	ELEVATOR (INCL. BALANCE WEIGHT LBS.)					
20	RUDDERS (INCL. BALANCE WEIGHT 0 LBS.)				35.0	
21						
22						
23	BODY GROUP					4,560
24	FUSELAGE OR HULL - BASIC STRUCTURE				2,983	
25	BOOMS - BASIC STRUCTURE					
26	SECONDARY STRUCTURE FUSELAGE OR HULL				722.0	
27	- BOOMS					
28	- SPEEDBRAKES				63.0	
29	- DOORS, PANELS & MISC.				792.0	
30						
31	ALIGHTING GEAR GROUP - LAND (TYPE:)					1,072
32-33	LOCATION	WHEELS, BRAKES TIRES, TUBES, AIR	STRUCTURE	CONTROLS		
34		363	385	122	870	
35		44	105	53	202	
36						
37						
38						
39						
40	ALIGHTING GEAR GROUP - WATER					
41	LOCATION	FLOATS	STRUTS	CONTROLS		
42						
43						
44						
45						
46	SURFACE CONTROLS GROUP					474
47	COCKPIT CONTROLS				150	
48	AUTOMATIC PILOT					
49	SYSTEM CONTROLS (INCL. POWER & FEEL CONTROLS LBS.)				324	
50						
51	ENGINE SECTION OR NACELLE GROUP					38
52	INBOARD					
53	CENTER					
54	OUTBOARD					
55	DOORS, PANELS & MISC.					
56						
57	TOTAL (TO BE BROUGHT FORWARD)					9,718

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 9 DATE 4 April 1957

CHANGE (ECP) NO. 1223B MODEL TF-102A REVISED 18 October 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Afterburner Recirculating Igniter Valve - Revision of. Pratt and Whitney ECP 69123C. CCN 8N-1753(150)

CHANGE

Item 3

FROM: Engine Installation J-57-P23

TO: Engine Installation J57-P-23
(Effective on A/C Ser. Nos. 54-1351 thru 56-2331)

Engine Installation J57-P-23A
(Effective on A/C Ser. Nos. 56-2332 thru 56-2379)

S AFFECTED:

BY W R Young

APPROVED BY P. R. Carlson 4/4

AN-9103-D
NAME
DATE

GROUP WEIGHT STATEMENT
WEIGHT EMPTY

PAGE 8
MODEL TF-102A
REPORT ZD-8-004-A

CONFIDENTIAL

		AUXILIARY	MAIN	
1	PROPULSION GROUP			6,318
2				
3	ENGINE INSTALLATION J-57-P23		5,058	✓
4	AFTERBURNERS (IF FURN. SEPARATELY)			
5	ACCESSORY GEAR BOXES & DRIVES			
6	SUPERCHARGERS (FOR TURBO TYPES)			
7	AIR INDUCTION SYSTEM		718	
8	EXHAUST SYSTEM		117	
9	COOLING SYSTEM		14	
10	LUBRICATING SYSTEM	29	4	
11	TANKS			
12	COOLING INSTALLATION			
13	DUCTS, PLUMBING, ETC.			
14	FUEL SYSTEM		302	
15	TANKS - PROTECTED			
16	- UNPROTECTED			
17	PLUMBING, ETC.			
18	WATER INJECTION SYSTEM			
19	ENGINE CONTROLS		34	
20	STARTING SYSTEM		42	
21	PROPELLER INSTALLATION			
22				
23				
24	AUXILIARY POWER PLANT GROUP			
25	INSTRUMENTS & NAVIGATIONAL EQUIPMENT GROUP			143
26	HYDRAULIC & PNEUMATIC GROUP			275
27				
28				
29	ELECTRICAL GROUP			569
30				
31				
32	ELECTRONICS GROUP			2,253
33	EQUIPMENT			
34	INSTALLATION			
35				
36	ARMAMENT GROUP (INCL. GUNFIRE PROTECTION LBS.)			597
37	FURNISHINGS & EQUIPMENT GROUP			367
38	ACCOMMODATIONS FOR PERSONNEL		284	
39	MISCELLANEOUS EQUIPMENT		59	
40	FURNISHINGS		10	
41	EMERGENCY EQUIPMENT		14	
42				
43	AIR CONDITIONING & ANTI-ICING EQUIPMENT GROUP			232
44	AIR CONDITIONING		167	
45	ANTI-ICING		65	
46				
47	PHOTOGRAPHIC GROUP			
48	AUXILIARY GEAR GROUP			71
49	HANDLING GEAR		14	
50	ARRESTING GEAR		57	
51	CATAPULTING GEAR			
52	ATO GEAR			
53				
54				
55	MANUFACTURING VARIATION			
56	TOTAL FROM PG. 2			9,718
57	WEIGHT EMPTY			20,543

CONFIDENTIAL

AN-9103-D
NAME
DATE

GROUP WEIGHT STATEMENT
USEFUL LOAD & GROSS WEIGHT

PAGE 10
MODEL TF-102A
REPORT ZD-8-004-A

1	LOAD CONDITION				Design		Alternate Rockets	Alternat Ferry
2								
3	CREW (NO. 2) Incl. Parachute				460		460	460
4	PASSENGERS (NO.)							
5	FUEL	Type	Gals.					
6	UNUSABLE	JP-4	11.4		74		74	74
7	INTERNAL	JP-4	1,050		6,825		6,825	6,825
8								
9								
10	EXTERNAL	JP-4	460					2,990
11	External Tank Provisions							76
12	BOMB BAY							
13	External Tank & Pylon - Droppable							266
14	OIL							
15	TRAPPED				25		25	25
16	ENGINE				25		25	25
17								
18	FUEL TANKS (LOCATION)							
19	WATER INJECTION FLUID (GALS)							
20								
21	BAGGAGE							
22	CARGO							
23								
24	ARMAMENT							
25	GUNS (Location)	Fix. or Flex.	Qty.	Cal.				
26								
27								
28								
29								
30								
31								
32	AMMUNITION							
33								
34								
35								
36								
37								
38								
39	INSTALLATIONS (BOMB, TORPEDO, ROCKET, ETC.)							
*40	BOMB OR TORPEDO RACKS							
41	Missiles (6)				801			801
42	Missiles Launchers (6) & Installation				174			174
43	Rockets (24) in Doors				432		432	432
44	Rockets (72) in Pods						1,296	
45	Rocket Pods (6)						280	
46	EQUIPMENT							
47	PYROTECHNICS							
48	PHOTOGRAPHIC							
49								
*50	OXYGEN							
51								
52	MISCELLANEOUS				36		83	36
53								
54								
55	USEFUL LOAD				8,852		9,500	12,184
56	WEIGHT EMPTY				20,543		20,543	20,543
57	GROSS WEIGHT				29,395		30,043	32,727

*If not specified as weight empty.

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 11 **DATE** 17 August 1956
CHANGE (ECP) NO. 543 **MODEL** TF-102A **REVISED** 20 May 1957
CONTRACT AF33(600)-31174
AUTHORITY AND REASON FOR CHANGE: Case XX Camber Leading Edge - Change to. CCN #25 MSN 7N-1735 dtd 12 Sept. 1956.

CHANGE

CHANGE:

FROM:

	Wing
Line 10-GROSS AREA (SQ. FT.)	695.05
Line 27-ELEVONS	67.15

TO:

	Wing
Line 10-GROSS AREA (SQ. FT.)	695.05
Line 27-ELEVONS	67.15

(NOTE: Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2335)

	Wing
Line 10-GROSS AREA (SQ. FT.)	697.83
Line 27-ELEVONS	68.36

(NOTE: Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 11

DATE 24 July 1956

CHANGE (ECP) NO. 529

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC wire MCPHFC(RDZSFG) 1622 dtd 10 April 1956. Vertical Tail, Change to. Reference ECP 1131. CCN #117 MSN 7N-5263, dtd 13 Feb. 1957; CCN #91 MSN 7N-5264, dtd 28 Feb. 1957; CCN #69 MSN 7N-5265, dtd 28 Feb. 1957.

CHANGE

GROUP WEIGHT STATEMENT

DIMENSIONAL AND STRUCTURAL DATA

FROM:

		V. Tail
Line 10	GROSS AREA (SQ. FT.)	68.33
Line 11	WEIGHT/GROSS AREA (LBS./SQ.FT.)	4.61
Line 12	SPAN (FT.) ACTUAL	8.42
Line 16	SWEEPBACK AT 0% CHORD LINE (DEGREES)	60.00
Line 24	TAIL LENGTH-25% MAC WING TO 25% VERTICAL TAIL (FT.)	13.88

TO:

Line 10	GROSS AREA (SQ. FT.)	68.33
Line 11	WEIGHT/GROSS AREA (LBS./SQ.FT.)	4.61
Line 12	SPAN (FT.) ACTUAL	8.42
Line 16	SWEEPBACK AT 0% CHORD LINE (DEGREES)	60.00
Line 24	TAIL LENGTH-25% MAC WING TO 25% VERTICAL TAIL (FT.)	13.88

(Effective on A/C Ser. Nos. AF54-1351, 54-1352, 54-1354, 54-1358 thru 54-1360)

Line 10	GROSS AREA (SQ.FT.)	95.14
Line 11	WEIGHT/GROSS AREA (LBS./SQ.FT)	5.69
Line 12	SPAN (FT.) ACTUAL	11.46
Line 16	SWEEPBACK AT 0% CHORD LINE (DEGREES)	52.50
Line 24	TAIL LENGTH-25% MAC WING TO 25% VERTICAL TAIL (FT.)	14.12

(Effective on A/C Ser. Nos. AF54-1353, 54-1355 thru 54-1357, 54-1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY R E Martin

APPROVED BY

FORM 618C

CONFIDENTIAL

A. -9103-D
NAME
DATE

GROUP WEIGHT STATEMENT
DIMENSIONAL & STRUCTURAL DATA

PAGE 11
MODEL TF-102A
REPORT ZD-8-004-

1 LENGTH - OVERALL (FT.) HEIGHT - OVERALL - STATIC (FT.)

	Main Floats	Aux. Floats	Booms	Fuse or Hull	Nacelles Inboard	Nacelles Center	Nacelles Outboard
2							
3 LENGTH - MAX. (FT.) (Not Incl. Airspeed Boom)				59.19			
4 DEPTH - MAX. (FT.)				6.90			
5 WIDTH - MAX. (FT.)				7.40			
6 WETTED AREA (SQ. FT.)							
*7 FLOAT OR HULL DISPL. - MAX (LBS.)							

8 FUSELAGE VOLUME (CU. FT.) PRESSURIZED TOTAL

9	Wing	H Tail	V. Tail
10 GROSS AREA (SQ. FT.)	695.05		68.33
11 WEIGHT/GROSS AREA (LBS./SQ. FT.)	4.58		5.52
12 SPAN (FT.) Actual	38.13		8.42
13 FOLDED SPAN (FT.)			
14			
15 SWEEPBACK - AT 25% CHORD LINE (DEGREES)			
16 - AT 0 % CHORD LINE (DEGREES)	60.10		60.00
**17 THEORETICAL ROOT CHORD - LENGTH (INCHES)			
18 - MAX. THICKNESS (INCHES)			
***19 CHORD AT PLANFORM BREAK - LENGTH (INCHES)			
20 - MAX. THICKNESS (INCHES)			
***21 THEORETICAL TIP CHORD - LENGTH (INCHES)			
22 - MAX. THICKNESS (INCHES)			

23 DORSAL AREA, INCLUDED IN (FUSE.) (HULL) (V. TAIL) AREA (SQ. FT.)
24 TAIL LENGTH - 25% MAC WING TO 25% MAC ~~H. TAIL (FT.)~~ Vertical Tail (ft.) 13.88

25 AREAS (SQ. FT.)	Flaps	L.E.	T.E.		
26	Lateral Controls	Slots	Spoilers	Ailerons	
27	Speed Brakes	Wing	Fuse. or Hull	Elevons	67.15
28					
29					

30 ALIGHTING GEAR (LOCATION)	Main	Nose
31 LENGTH - OLEO EXTENDED - ℄ AXLE TO ℄ TRUNNION (INCHES)	62.5	43.5
32 OLEO TRAVEL - FULL EXTENDED TO FULL COLLAPSED (INCHES)	10.0	8.0
33 FLOAT OR SKI STRUT LENGTH (INCHES)		

34 ARRESTING HOOK LENGTH - ℄ HOOK TRUNNION TO ℄ HOOK POINT (INCHES)
35 HYDRAULIC SYSTEM CAPACITY (GALS.) Primary= 3 (approx); Secondary= 4 (approx)

36 FUEL & LUBE SYSTEMS	Location	No. Tanks	****Gals. Protected	No. Tanks	****Gals. Unprotected
37 Fuel - Internal	Wing			2	1050
38	Fuse. or Hull				
39 - External	Wing			2	460
40 - Bomb Bay					
41					
42 Oil	Engine			1	
43					
44					

45 STRUCTURAL DATA - CONDITION	Fuel in Wings (Lbs.)	Stress Gross Weight	Ult. L.F.
46 FLIGHT	4,095	26,800	8.0
47 LANDING	1,706	23,371	4.5
48			
49 MAX. GROSS WEIGHT WITH ZERO WING FUEL		22,780	10.5
50 CATAPULTING			
51 MIN. FLYING WEIGHT		21,758	10.5
52 LIMIT AIRPLANE LANDING SINKING SPEED (FT./SEC.)			9.0
53 WING LIFT ASSUMED FOR LANDING DESIGN CONDITION (%W)			100.
54 STALL SPEED - LANDING CONFIGURATION - POWER OFF (KNOTS)			
55 PRESSURIZED CABIN - ULT. DESIGN PRESSURE DIFFERENTIAL - FLIGHT (P.S.I.)			11.0
56			

57 AIRFRAME WEIGHT (AS DEFINED IN AN-W-11) (LBS.)

---

*Lbs. of sea water @ 64 lbs./cu. ft.
**Parallel to ℄ at ℄ airplane.
***Parallel to ℄ airplane.
****Total usable capacity.

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3.1.3.1	Alternate Armament Loading (96 Rockets)	Lb 30,043
3.1.3.2	Take-off Gross Weight (Design Useful Load)	Lb 29,395

3.1.4 CENTER OF GRAVITY LOCATIONS:

Take-off gross weight, center of gravity location, wheels up:

Aft leading edge of MAC	% MAC 25.7
Above leading edge of MAC	Inches 7.2

Take-off gross weight, center of gravity location, wheels down:

Aft leading edge of MAC	% MAC 25.7
Above leading edge of MAC	Inches 5.8

Extreme positions of center of gravity possible in flight:

	Most Fwd		Most Aft	
	% MAC	Above L. E. MAC (In.)	% MAC	Above L. E. MAC (In.)
Wheels Up	19.5	9.2	----	----
Wheels Down	----	----	28.7	6.9

3.1.4.1 See Figure 3, Page 13, for Chart of Center of Gravity Limitations.

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SPECIFICATION CHANGE NOTICE
FINAL
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SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 13
DATE 12 July 1955
CHANGE (ECP) NO. 507
MODEL TF-102A
REVISED 13 October 1956
CONTRACT AF33(600)-23903 & -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor requested Call-Out of Aft Aerodynamic Limit - Correction of. CCN #63 MSN 6N-4606, dated 30 January 1956 and CCN #27 MSN 6N-4746, dated 2 February 1956, CCN #4 MSN 6N-6174, dtd 5-10-56.

CHANGE

CHANGE: Callout at bottom of page to read:

FROM: (Aft Aerodynamic Limit 30.5%)

TO: (Aft Aerodynamic Limit 27.5%)

Effective on A/C Ser. Nos. AF54-1351 thru 56-2379.

AIRPLANES AFFECTED:

BY W. A. Young Jr

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AIRPLANE CENTER OF GRAVITY CHART

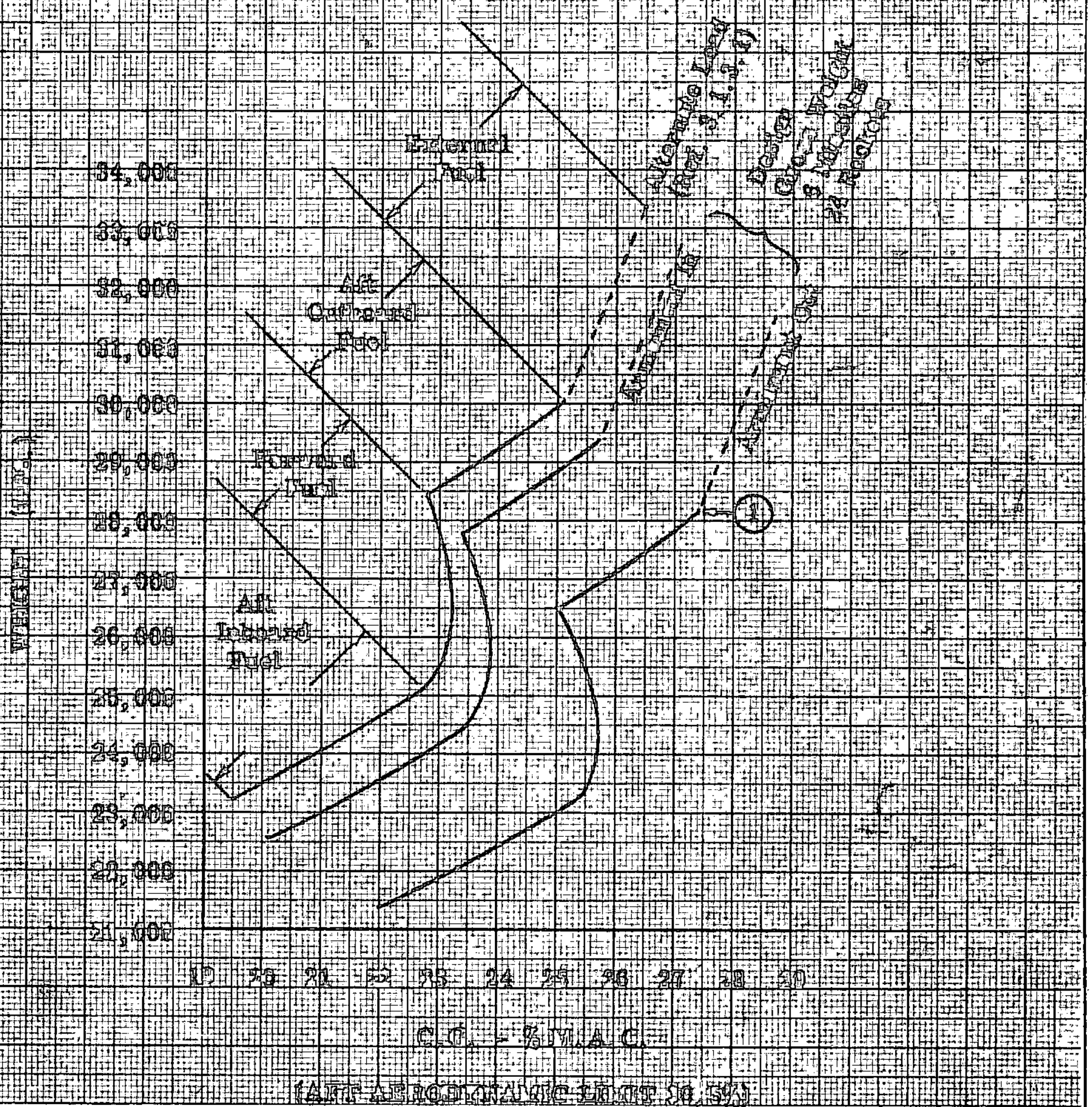

Figure 3

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 14

DATE 17 August 1956

CHANGE (ECP) NO. 543

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Case XX Camber Leading Edge - Change to. CCN #25 MSN 7N-1735 dtd 12 Sept. 1956.

CHANGE

3.1.5 AREAS (Not to be used for inspection purposes):

FROM: Wing Area, total, including elevons .... 695.05 sq ft
Elevon area, aft of hinge line .... 67.15 sq ft

TO: Wing area, total, including elevons .... 695.05 sq ft
Elevon area, aft of hinge line .... 67.15 sq ft
(NOTE: Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2335)

Wing area, total, including elevons .... 697.83 sq ft
Elevon area, aft of hinge line .... 68.36 sq ft
(NOTE: Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

3.1.6 DIMENSIONS AND GENERAL DATA (Not to be used for inspection purposes):

FROM: Wing:
Span, maximum (theoretical) .... 39 ft 0.1 in
Sweepback of leading edge .... 60° 6' 13"
Aspect ratio 2.2

TO: Wing:
Span, maximum (theoretical) .... 39 ft 0.1 in
Sweepback of leading edge .... 60° 6' 13"
Aspect ratio 2.2
(NOTE: Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2335)

Wing:
Span, maximum (theoretical) .... 39 ft 0.2 in
Sweepback of leading edge .... 60°
Aspect ratio 2.198
(NOTE: Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

AIRPLANES AFFECTED:

BY

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SAN DIEGO, CALIFORNIA

Page 1 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 14

DATE 24 July 1956

CHANGE (ECP) NO. 529

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC wire MCPHFC(RDZSFG) 1622 dated 10 April 1956. Vertical Tail, Change to. ECP 1131 Reference. CCN #117 MSN 7N-5263, dtd 13 Feb. 1957; CCN #91 MSN 7N-5264, dtd 28 Feb. 1957; CCN #69 MSN 7N-5265, dtd 28 Feb. 1957.

CHANGE

3.1.5 AREAS: (Not to be used for inspection purposes):

FROM:

TAIL:	
Vertical Tail Area, Total	68.33 sq. ft.
Fin	60.9 sq. ft.
Rudder, aft of hinge	7.43 sq. ft.

TO:

TAIL:	
Vertical Tail Area, Total	68.33 sq. ft.
Fin	60.9 sq. ft.
Rudder, aft of hinge	7.43 sq. ft.

(Effective on A/C Ser. Nos. AF54-1351, 54-1352, 54-1354, 54-1358 thru 54-1360)

TAIL:	
Vertical Tail Area, Total	95.14 sq. ft.
Fin	85.44 sq. ft.
Rudder, aft of hinge	9.70 sq. ft.

(Effective on A/C Ser. Nos. AF54-1353, 54-1355 thru 54-1357, 54-1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

3.1.6 DIMENSIONS AND GENERAL DATA (Not to be used for inspection purposes):

FROM:

TAIL:	
Vertical:	
Airfoil Section:	
Designation	NACA 0004-65 (MOD)
Thickness (percent chord)	4
Sweepback of leading edge	60 degrees
Aspect Ratio	1.10

AIRPLANES AFFECTED:

BY RA Martin

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Page 2 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 14 (Cont)

DATE 24 July 1956

CHANGE (ECP) NO. 529

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC wire MCPHFC(RDZSFG) 1622 dated 10 April 1956. Vertical Tail, Change to. Reference ECP 1131. CCN #117 MSN 7N-5263 dtd 13 Feb. 1957; CCN #91 MSN 7N-5264 dtd 28 Feb. 1957; CCN #69 MSN 7N-5265 dtd 28 Feb. 1957.

CHANGE

3.1.6 DIMENSIONS AND GENERAL DATA (Not to be used for inspection purposes): (Cont)

TO:

TAIL:
Vertical:
Airfoil Section:

Designation	NACA 0004-65 (MOD)
Thickness (percent chord)	4
Sweepback of leading edge	60 degrees
Aspect Ratio	1.10

(Effective on A/C Ser. Nos. AF54-1351, 54-1352, 54-1354, 54-1358 thru 54-1360)

TAIL:
Vertical:
Airfoil Section:

Designation	NACA 0004-65 (MOD)
Thickness (percent chord)	4
Sweepback of leading edge	52 degrees 30 minutes
Aspect Ratio	1.38

(Effective on A/C Ser. Nos. AF54-1353, 54-1355 thru 54-1357, 54-1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

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3.1.5 AREAS (Not to be used for inspection purposes):

Wing area, total, including elevons	695.05 sq ft
Elevon area, aft of hinge line	67.15 sq ft
Vertical Tail area, total	68.33 sq ft
Fin	60.9 sq ft
Rudder, aft of hinge	7.43 sq ft

3.1.6 ① DIMENSIONS AND GENERAL DATA (Not to be used for inspection purposes):

Wing:	
Span, maximum (theoretical)	39 ft 0.1 in.
Chord:	
At root	35 ft 7.6 in.
At tip (Theoretical)	0
Mean aerodynamic	23 ft 9.1 in.
Airfoil section:	
Designation	NACA 0004-65 (Mod)
Thickness (percent chord)	4
Incident (degrees):	
At root	0
At tip	0
Sweepback of leading edge	60° 6' 13"
Dihedral	0 degrees
Aspect ratio	2.2
Elevons:	
Span, each	12 ft 10.7 in.
Chord:	
Tip	2 ft 0.4 in.
Root	3 ft 1.9 in.

Tail:	
Vertical:	
Airfoil Section:	
Designation	NACA 0004-65 (Mod)
Thickness (percent chord)	4
Sweepback of leading edge	60 degrees
Aspect ratio	1.10

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 15

DATE 24 January 1955

CHANGE (ECP) NO. $1010R_1$

MODEL TF-102A

REVISED 21 July 1955

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor request. To improve Landing and Take-off Characteristics. Supp. Agr. #21, CCN #7N-1599(47)

CHANGE

3.1.6 DIMENSIONS AND GENERAL DATA: (Cont)

	CHANGE AS INDICATED	
	FROM	TO
Height Over Vertical Tail:		
Reference Line Level (W.L. 0.00-MLG-Static)	18 ft 2 in.	18 ft 1.10 in.
Three-Point Position (Static)	18 ft 2 in.	17 ft 11.6 in.
Ground Angle (Tail Down)	18 degrees	16° 42'
Tread of Main Wheels	14 ft 6 in.	14 ft 2.24 in.
Wheelbase	23 ft 3.9 in.	22 ft 4.65 in.
Angle between lines joinging center of gravity with points of contact of main wheel tires, static deflection of 1 W (Front Elevation)	100° 16' 24"	99° 18'
Angle of line through center of gravity and ground contact point of main wheel tire to vertical line, Reference line level, Static deflection of 1 W (Side Elevation)	33° 4' 20"	28° 24'

AIRPLANES AFFECTED: All

BY W. A. Young

APPROVED BY

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 15
DATE 24 July 1956
CHANGE (ECP) NO. 529
MODEL TF-102A
REVISED 20 May 1957
CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC wire MCPHFC(RDZSFG) 1622 dated 10 April 1956. Vertical Tail, Change to. CCN #117 MSN 7N-5263 dtd 13 Feb. 1957; CCN #91 MSN 7N-5264 dtd 28 Feb. 1957; CCN #69 MSN 7N-5265 dtd 28 Feb. 1957. Reference ECP 1131.

CHANGE

3.1.6 DIMENSIONS AND GENERAL DATA: (Cont)

FROM:

Height over vertical tail:
Reference line level .... 18 ft. 2 in.
Three-point position .... 18 ft. 2 in.

TO:

Height over vertical tail:
Reference line level .... 18 ft. 2 in.
Three-point position .... 18 ft. 2 in.

(Effective on A/C Ser. Nos. AF54-1351, 54-1352, 54-1354, 54-1358 thru 54-1360)

Height over vertical tail:
Reference line level .... 21 ft. 2.53 in.
Three-point position .... 21 ft. 2.53 in.

(Effective on A/C Ser. Nos. AF54-1353, 54-1355 thru 54-1357, 54-1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

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3.1.6 DIMENSIONS AND GENERAL DATA: (Cont)

Height over vertical tail:	
Reference line level	18 ft 2 in.
Three-point position	18 ft 2 in.
Length, maximum (including nose boom)	63 ft 4.25 in.
Distance from 25% MAC to rudder 25% chord Line	20 ft 4.2 in.
Ground angle (Tail down)	18 degrees
Wheel rim size:	
Main wheels	15 inches
Nose wheel	14 inches
Tire size:	
Main wheels	30 x 8.8
Nose wheel	24 x 5.5
Tread of main wheels	14 ft 6 in.
Wheelbase	23 ft 3.9 in.
Vertical travel of axle from extended to fully compressed position:	
Main wheels	10 inches
Nose wheel	8 inches
* Angle between lines joining center of gravity with points of contact of main wheel tires, static deflection of 1 W (front elevation	100° 16' 24"
* Angle of line through center of gravity and ground contact point of main wheel tire to vertical line, reference line level, static deflection of 1 W (side elevation)	33° 4' 20"

* At CG of point (1) on Figure 3, Page 13.

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 16

DATE 2 September 1955

CHANGE (ECP) NO. 1022 **MODEL** TF-102A

REVISED 13 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor requested change to improve the Longitudinal Control. CCN #206 MSN 6N-3379, dtd 12-12-55, CCN #59 MSN 6N-3498, dtd 12-5-55, & CCN #49 MSN 7N-1523, dtd 9-6-56.

CHANGE

3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS:

FROM:

	Elevons (as elevators)	25°up	10°down

TO:

	Elevons (as elevators)	25°up	8°down

Effective on A/C Ser. Nos. AF54-1351 thru 56-2379.

AIRPLANES AFFECTED:

BY W. A. Young Jr.

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SAN DIEGO, CALIFORNIA

Page 1 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 16

DATE 24 July 1956

CHANGE (ECP) NO. 529

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC Wire MCPHFC(RDZSFG) 1622 dated 10 April 1956. Vertical Tail -Change to. Reference ECP 1131. CCN #117 MSN 7N-5263 dtd 13 Feb. 1957; CCN #91 MSN 7N-5264 dtd 28 Feb. 1957; CCN #69 MSN 7N-5265 dtd 28 Feb. 1957.

CHANGE

3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS:

FROM:

Rudder	25° right	25° left
Rudder Pedals	3.25" fwd	3.25" aft
Elevons (as elevators)	25° up	8° down
Elevons (as ailerons)	6.7° up	6.7° down
Elevons (Control Stick)	5" fwd	9" aft
Elevons (Control Stick)	4" right	4" left
Speed Brakes	45° maximum travel	

TO:

Rudder	25° right	25° left
Rudder Pedals	3.25" fwd	3.25" aft
Elevons (as elevators)	25° up	8° down
Elevons (as ailerons)	6.7° up	6.7° down
* Elevator Control (Stick)	* 3.52" fwd	* 8.37" aft
* Aileron Control (Stick)	* 4.13" right	* 4.13" left
Speed Brakes	45° maximum travel	

(Effective on A/C Ser. Nos. AF54-1351, 54-1352, 54-1354, 54-1358 thru 54-1360)

Rudder	25° right	25° left
Rudder Pedals	3.25" fwd	3.25" aft
Elevons (as elevators)	25° up	8° down
Elevons (as ailerons above 450 knots IAS and below 20,000 ft)	4.5° up	4.5° down
Elevons (as ailerons, below 450 knots IAS or above 20,000 ft)	6.3° up	6.3° down
* Elevator Control (Stick)	* 3.52" fwd	* 8.37" aft
Aileron Control (Stick, above 450 knots IAS and below 20,000 ft)	2.77" right	2.77" left

Continued on Page 16, 2 of 2

AIRPLANES AFFECTED:

BY R A Martin

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CONVAIR
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SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 16 (Cont) DATE 24 July 1956
CHANGE (ECP) NO. 529 MODEL TF-102A REVISED 20 May 1957
CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC wire MCPHFC(RDZSFG) 1622 dated 10 April 1956. Vertical Tail - Change to. Reference ECP 1131. CCN #117 MSN 7N-5263 dtd 13 Feb. 1957; CCN #91 MSN 7N-5264 dtd 28 Feb. 1957; CCN #69 MSN 7N-5265 dtd 28 Feb. 1957.

CHANGE

3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS: (Cont)

TO: (Cont)	Aileron Control (Stick, below 450 knots IAS or above 20,000 ft)	3.88" right	3.88" left
	Speed Brakes	45° maximum travel	

(Effective on A/C Ser. Nos. AF54-1353, 54-1355 thru 54-1357, 54-1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

NOTE: Changes denoted by an asterisk (*) are to correct nomenclature and control stick movements which were erroneous in the original specification. Remainder of changes are due to the enlarged Vertical Tail.

AIRPLANES AFFECTED:

BY

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3.1.7 CONTROL SURFACE AND CORRESPONDING CONTROL MOVEMENTS:

(Not to be used for inspection purposes) Control surface and control movements on each side of neutral position for full movement as limited by stops, are as follows:

Rudder	25°	right	25°	left
Rudder pedals	3.25"	fwd	3.25"	aft
Elevons (as elevators)	25°	up	10°	down
Elevons (as ailerons)	6.7°	up	6.7°	down
Elevon (Control stick)	5"	fwd	9"	aft
Elevon (Control stick)	4"	right	4"	left
Speed brakes	45°	maximum travel		

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3.2 GENERAL:

3.2.1 GENERAL INTERIOR ARRANGEMENT: The interior of the fuselage shall be arranged from nose to tail to provide the following:

(a) A nose section including a radome to house the radar antenna and radar equipment of the fire control system.

(b) A pressurized pilot's compartment with two seats, dual flight controls and equipment. A section to house the nose wheel in the retracted position is located below the floor of this compartment.

(c) An intermediate fuselage section to accommodate the communication and navigation equipment, components of the fire control system and refrigeration equipment.

(d) An armament section to house the missiles and rockets and their displacing gears. Armament provisions in this section shall be as specified in paragraphs 3.2.13.1 and 3.18. The forward wing spar shall attach to fuselage bulkheads in this section.

(e) An accessory section to accommodate miscellaneous hydraulic, pneumatic, electrical and electronic equipment. Through the upper portion of this section passes the engine air intake ducts.

(f) A section to accommodate the turbo-jet engine, the electrical power supply, airframe controls and wells in the lower forward portion to house the main landing gear in the retracted position. The wing main and rear spars shall attach to fuselage bulkheads in this section.

(g) An aft compartment containing the engine afterburner, airframe control system valves and linkages.

3.2.2 ㊵ (96) (132) (133) (134) MATERIALS: Materials shall be in accordance with applicable specifications and shall be selected in accordance with ANA Bulletin 143, except as otherwise noted herein and in Appendix II. Castings shall be designed and inspected in accordance with Specification MIL-C-6021B.

CONVAIR
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SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 18 **DATE** 15 February 1956

CHANGE (ECP) NO. 1127 **MODEL** TF-102A **REVISED** 26 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested. Cataloging and Standardization Div. Conference of 7-9 Feb. 1956. Convair Ltr. 6-7071 dtd 1-3-56. CCN #61 MSN 6N-2879 dtd 1-18-56, CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #4 MSN 6N-6174 dtd 5-10-56.

CHANGE

FROM:

3.2.5 INTERCHANGEABILITY AND REPLACEABILITY: The component parts of the airplanes shall be interchangeable or replaceable, as the case may be, in accordance with and to the extent required by, Specification No. AN-I-21, and shall be manufactured in conformity with the provisions of such specification, as noted in Appendix III herein.

TO:

*3.2.5 INTERCHANGEABILITY AND REPLACEABILITY: The component parts of all aircraft of the same model which are not peculiar to a particular series and block number designation, shall be interchangeable or replaceable in accordance with and to the extent required by, Specification MIL-I-8500A, and shall be manufactured in conformity with the provisions of Specification MIL-I-8500A and as modified by the approved working list 8-00014-1.

* Effective on A/C Ser. Nos. AF54-1351 thru 56-2379.

AIRPLANES AFFECTED:

BY W. R. Young Jr

APPROVED BY

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3.2.3 WORKMANSHIP: Workmanship shall conform to high grade aircraft practice as defined by the Contractor's quality control procedures.

3.2.4 PRODUCTION, MAINTENANCE AND REPAIR: In the design of the airplane, consideration shall be given to ease of production, rapid power plant and equipment installation and ease of servicing and maintenance. Special attention shall be given to simplification of accessibility for routine checks of equipment and provisions for general field maintenance at advance bases where elaborate ground equipment is not usually available. Servicing provisions shall be designed to permit maximum utilization of the airplane. Special tools shall be limited to the practicable minimum and shall conform to Specifications MIL-D-8512 and MIL-D-8513.

3.2.5 (145) INTERCHANGEABILITY AND REPLACEABILITY: The component parts of the airplanes shall be interchangeable or replaceable, as the case may be, in accordance with and to the extent required by Specification No. AN-I-21, and shall be manufactured in conformity with the provisions of such specification, as noted in Appendix III herein.

3.2.6 FINISH: The finish for the airplane and parts shall be in accordance with the Contractor's finish specification which shall be in general accordance with Specification MIL-F-7179. In general, exterior paint is not required.

3.2.7 (222) (223) IDENTIFICATION AND MARKING: The airplane and components thereof shall be identified and otherwise marked in accordance with Specifications No. AN-M-13a (1) and 98-24105S (3).

3.2.8 EXTREME TEMPERATURE OPERATION: The aircraft as a whole, including aeronautical equipment, shall be so constructed that it will function satisfactorily in any or all temperature conditions that will be encountered. A ground temperature of -65°F has been established as the minimum temperature at which the aircraft shall operate.

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3.2.8 EXTREME TEMPERATURE OPERATION (Cont)

The complete airplane, except the transparent portion of the pilots' enclosure, shall be capable of operating at a maximum stagnation temperature of 160°F (140°F boundary layer) based on an Air Force "Standard" day. The transparent portion of the pilots' enclosure shall be designed to a stagnation temperature of 205°F (194°F boundary layer) based on an Air Force "hot" day. The above requirements are as outlined in Convair Report No. ZU-8-027.

3.2.9 CLIMATIC REQUIREMENTS: The aircraft and its equipment shall not be adversely affected by other climatic conditions incident to the above temperature range, and shall be capable of transfer from one climate to another without penalty of extensive modification and adjustment.

3.2.10 LUBRICATION: Lubrication of the airplane shall be in accordance with Specification No. MIL-L-6880A.

(249)

3.2.11 STANDARD PARTS: The use of standard parts shall be in accordance with the requirements of Paragraph 3.2.2.

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thru
㉗ (287)

3.2.11.1 Bearings shall meet the requirements of the applicable revision of the Handbook of Instructions for Aircraft Designers, except as noted in the specifications for bearings listed in Air Force Bulletin No. 59, dated 1 January 1951 and deviations of Appendix II.

㉘ ㉙ (55)
(58) (141) (142)
(146)

3.2.12 CREW: The crew shall consist of one student and one instructor seated side by side. The student station shall be located on the left side of the pilots' compartment.

CONFIDENTIAL

3.2.13 EQUIPMENT INSTALLATION:

3.2.13.1 ARMAMENT: Complete provisions shall be made for mounting and firing the following weapons:

Rocket	2.75" FFAR	24
Guided Missile	GAR-1	6

OR

Rocket	2.75" FFAR	24
Guided Missile	GAR-1B	6

OR

Rocket	2.75" FFAR	24
Guided Missile	GAR-1	3
Guided Missile	GAR-1B	3

3.2.13.1.1 ARMAMENT - ALTERNATE ARRANGEMENT: Provisions shall be made for carrying the following alternate armament arrangement.

Rocket	2.75" FFAR	96
Guided Missile		0

Rocket tube packages and other accessories for utilizing this alternate arrangement shall be provided.

3.2.13.2 COMMUNICATION AND NAVIGATION EQUIPMENT: See Section 3.17.

3.2.14 EQUIPMENT AND FURNISHINGS INSTALLATION: The equipment and furnishings listed in Appendices I-A, I-B, and I-C of this model specification, shall be installed in the quantity and under the conditions specified herein.

3.3 AERODYNAMICS:

(159)(160)(204)

3.3.1 GENERAL: The airplane shall be designed and constructed to provide the maximum surface smoothness and trueness of aerodynamic contour that are consistent with rapid and economical manufacturing techniques and that are required for high performance.

3.3.2 STABILITY AND CONTROL:

3.3.2.1 The stability and controllability of the airplane shall be in accordance with Specification No. 1815B, except as noted in Appendix II.

(148) thru (156) (158)

3.3.2.2 PERMISSIBLE AERODYNAMIC CENTER OF GRAVITY: The aft center of gravity limit of the airplane shall be as shown on Figure 3 , Page 13.

3.3.2.3 It shall be possible to open the speed brakes in two seconds maximum from fully closed position to the position corresponding to 90% of nominal hydraulic system force, which corresponds to 2700 psi in the actuating cylinder. It shall be possible to open the brakes to any intermediate position.

3.3.2.4 The longitudinal deceleration provided by the speed brakes shall be at least 0.19g at 400 knots IAS.

3.4 STRUCTURAL DESIGN CRITERIA: Stress analysis criteria shall be as set forth in Convair Report No. ZU-8-027.

② ③ ④ ⑦ (7a)
㉛ ㉟ ㊱ ㊶ ㊺ (135)

3.4.1 LIMIT FLIGHT LOAD FACTORS:

3.4.1.1 Combat Gross Weight . . . . 26,800 lb

Maneuver: Positive 6.0 g symmetrical for all speeds and altitudes. (For other conditions see Table I, page 24, herein)

3.4.1.2 Maximum Take-off Weight . . . . 32,859 lb

Maneuver: Positive 3.0g, Negative -1.0g (See Table I, page 24 herein)

3.4.1.3 Minimum Flying Weight . . . . 21,758 lb

3.4.2 LIMIT GROUND LOAD FACTORS:

Taxiing:

Ground Maneuver @ Take-off (at maximum take-off weight of 32,859 lb) 2.0g

Landing:

Ground Landing (at normal take-off weight of 29,530 lb). . . . 2.0g

Ground Landing (at normal landing gross weight of 23,371 lb) . . . 3.0g

3.4.3 LIMIT DIVING SPEED: See Figure 4, Page 23, for limit diving speeds.

LIMIT DIVE SPEED

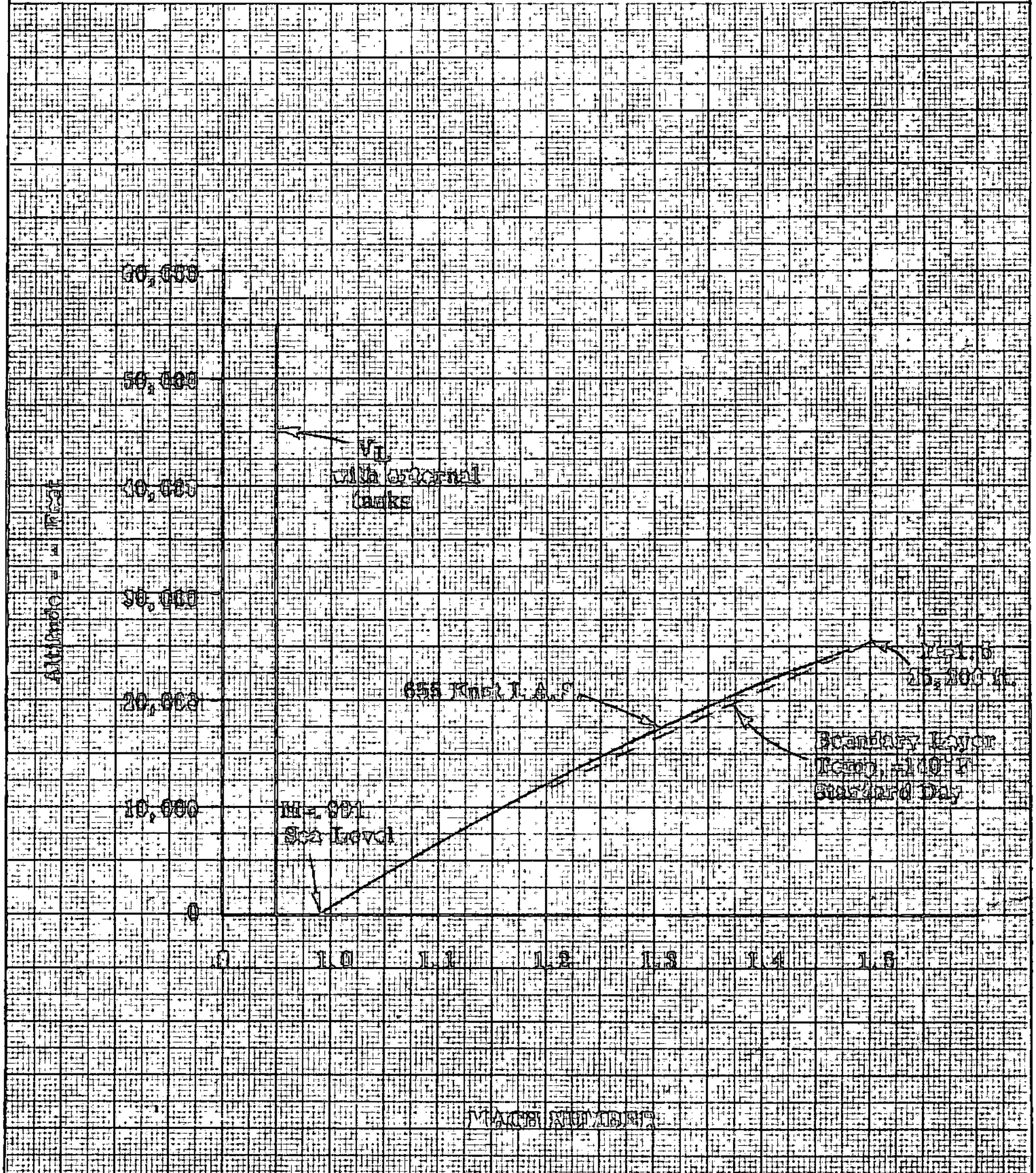

Figure 4

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SUMMARY OF DESIGN FLIGHT CONDITIONS

Configuration	Maneuver	Sym. Load Factor "g"	Min. Design Altitude	Design Speed Range	Remarks
Clean Airplane	Symmetrical Pullout	0 to + 6.0 -3 to 0	Sea Level 12,000 ft.	C_L=0.75 to V_L C_L=0.75 to V_L	
	Gust - Symmetrical & Lateral		Sea level	0 to V_H	$50\sigma^{1/2}$ ft/sec sharp edge gust
	Rolling pullout	0 to +3.9	12,000 ft.	C_L=0.75 to V_L	Full available aileron
	Rudder induced maneuvers	1.0	12,000 ft.	270 Kts to V_L	Rudder rapidly applied Limited to automatic control authority or to 180 pound pedal force.
External Fuel Tanks on Tanks full (max. take-off wt.)	Symmetrical pullout	-1.0 to +3.0	12,000 ft.	C_L=0.75 to M=.95	
Tanks empty	Symmetrical pullout	-3.0 to +5.33	12,000 ft.	C_L=0.75 to M=.95	
Full & empty	Symmetrical & Lateral gust		Sea level	0 to Cruise speed-Tanks on	$50\sigma^{1/2}$ ft/sec sharp edge gusts.
Armament Extended	Symmetrical Maneuver	-1.0 to +3.0	Sea level	C_L=.75 to V_L	
	Steady Sideslip	+1.0	12,000 ft.	C_L=.75 to V_L	Max. available with 180 pound pedal force
Landing Gear Extended	Symmetrical Pullup	0 to 2.5	Sea level	0 to 270 kts	
	Rudder induced Maneuver	1.0	Sea level	0 to 270 kts	Full rudder rapidly applied

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TABLE I

SUMMARY OF TF-102A DESIGN FLIGHT CONDITIONS

Configuration	Maneuver	Symmetrical Load Factor "g"	Design Speed Range	Restriction Imposed In Design	Remarks
Clean Airplane	Symmetrical Pullout	-3.0 to +6.0	C_L=0.75 to V_L	-1.6g below 12,000 ft and above V_C=480 kts.	
	Gusts-Lateral and Symmetrical		0 to V_H	Below 5,000 ft 0 to 600 kts.	50/0 ft/sec, sharp edge gust.
	Rolling Pullout	0 to +3.9	C_L=0.75 to V_L	4.5° of aileron below 20,000 ft and above V_C=450 kts.	Full available aileron (6.3°) in the unrestricted regions
	Rudder Induced Maneuvers	1.0	270 kts. to V_L		Rudder rapidly applied. Limited to automatic control authority or 180 lb pedal force.
External Fuel Tanks ON Tanks Full (Max. Take-Off Weight)	Symmetrical Pullout	-1.0 to 3.0	C_L=0.75 to M=0.95 or V_1=450 kts.		
	Rolling Pullout	0 to +2.33	C_L=0.75 to M=0.95 or V_1=450 kts.	3° aileron above V_C=270 kts.	Full available aileron (6.3°) with gear down.
	Rudder Induced Maneuver	1.0	C =0.75 to M=0.95 or V_1=450 kts.		No abrupt rudder deflection.
Tanks Empty (Full Internal Fuel)	Symmetrical Pullout	-2.5 to +5.10	C_L=0.75 to M=0.95 or V_1=450 kts.		

TABLE I (Cont)

SUMMARY OF TF-102A DESIGN FLIGHT CONDITIONS

Configuration	Maneuver	Symmetrical	Design Speed Range	Restriction Imposed In Design	Remarks
Tanks Empty (Full Internal Fuel)(Cont)	Rolling Pullout	0 to 3.9	C_L=0.75 to M=0.95 or V_i=450 kts.		
	Rudder Induced Maneuver	1.0	C_L=0.75 to M=0.95 or V_i=450 kts.		Rudder rapidly applied. Limited to automatic control authority or 180 lb pedal force.
Tanks Full or Empty	Lateral and Symmetrical Gusts		0 to M=0.95 or V_i=450 kts.		50/6 ½ ft/sec. sharp edge gust.
Armament Extended	Symmetrical Pullout	-1 to +3	C_L=0.75 to V_L		
	Steady Sideslip	1.0	C_L=0.75 to V_L		Arbitrary 1.0g lateral acceleration, n_y, will provide adequate strength. Actual maneuvers are not probable during short period for which armament is extended.
Landing Gear Extended	Symmetrical Pullup	0 to 2.5	0 to 270 kts.		
	Rudder Induced Maneuver	1.0	0 to 270 kts		Rapidly applied rudder. Limited to 300 lb pedal force.

NOTE: This revision makes the minimum design altitude sea-level for all conditions and reflects the incorporation of the large tail (ECP 529).

Effective on A/C Ser. Nos. AF54-1353, -1355 thru -1357, -1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379.

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 25 DATE 17 August 1956
CHANGE (ECP) NO. 543 MODEL TF-102A REVISED 20 May 1957
CONTRACT AF33(600)-31174
AUTHORITY AND REASON FOR CHANGE: Case XX Camber Leading Edge - Change to. CCN #25 MSN 7N-1735 dtd 12 Sept. 1956.

CHANGE

3.5.3

FROM: ELEVONS: Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be riveted metal torque box and rib construction with metal covering. The elevon restraint shall be sufficiently rigid to prevent flutter and/or buzz.

Differential motion (as ailerons) .... None
Distance from plane of symmetry to centroid of elevon area .... 8 ft 8.4 in
Type of balance .... None
Tabs .... None

TO: ELEVONS: Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be riveted metal torque box and rib construction with metal covering. The elevon restraint shall be sufficiently rigid to prevent flutter and/or buzz.

Differential motion (as ailerons) .... None
Distance from plane of symmetry to centroid of elevon area .... 8 ft 8.4 in
Type of balance .... None
Tabs .... None
(NOTE: Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2335)

ELEVONS: Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be riveted metal torque box and rib construction with metal covering. The elevon restraint shall be sufficiently rigid to prevent flutter and/or buzz.

Differential motion (as ailerons) .... None
Distance from plane of symmetry to centroid of elevon area .... 9 ft 1.9 in
Type of balance .... None
Tabs .... None
(NOTE: Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

AIRPLANES AFFECTED:

BY

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3.5 WING GROUP:

3.5.1 DESCRIPTION AND COMPONENTS: The wing shall be a delta wing in planform and shall include two elevons, integral fuel tanks and provisions for attachment of main landing gear and other equipment.

(82)

3.5.2 CONSTRUCTION:

3.5.2.1 The wing shall be basically of full cantilever, stressed skin, high strength aluminum alloy construction employing spanwise spars of either or both forged and built-up shear web type and built-up shear-web type chordwise ribs and bulkheads.

3.5.2.2 A portion of the wing interspar area outboard of the fuselage shall be designed for integral fuel tanks.

3.5.2.3 The wing shall incorporate "wing fences," cambered leading edges, space and structural provisions for "non-evaporative, running - wet" type thermal anti-icing.

⑥

3.5.2.4 Removable reflex type wing tips shall be provided.

3.5.2.5 The wing shall include space and structural provisions to accommodate the installation of external fuel tank kits described in Section 3.12.9.4 herein.

3.5.3 ELEVONS: Elevons shall be located in the trailing edge of the wing on each side of the fuselage. The elevons shall be riveted metal torque box and rib construction with metal covering. The elevon restraint shall be sufficiently rigid to prevent flutter and/or buzz.

Differential motion (as ailerons)	None
Distance from plane of symmetry to centroid of elevon area	8 ft 8.4 in.
Type of balance	None
Tabs	None

3.5.4 LIFT AND DRAG INCREASING DEVICES: None included as a portion of the Wing Group. See paragraphs 3.6.4.1 and 3.7.1.6.

3.6 TAIL GROUP:

3.6.1 DESCRIPTION AND COMPONENTS: The tail group shall consist of a single vertical fin and rudder.

3.6.2 STABILIZER: Not applicable.

3.6.3 ELEVATOR: Not applicable.

3.6.4 ⑥ FIN: The fin shall be basically of riveted cantilever, high strength aluminum alloy construction attached to the fuselage and including provision for attachment of the rudder. The structure shall consist of forged spars and built-up shearweb ribs with stressed metal covering. The fin shall have space and structural provisions for leading edge "non-evaporative, running-wet" type anti-icing. The tip shall be electrically isolated by plastic material as required to satisfy the antenna requirements.

3.6.4.1 DROGUE PARACHUTE: A drogue parachute shall be installed at the base of the vertical tail to provide additional or auxiliary braking power for use on ice-covered runways or when landing on short runways.

3.6.5 RUDDER: The rudder shall be of metal honeycomb construction with metal covering. Trim tabs are not required. Balancing of rudder is not required. The rudder restraint shall be sufficiently rigid to prevent flutter and/or buzz.

3.7 BODY GROUP:

3.7.1 FUSELAGE:

3.7.1.1 DESCRIPTION: The fuselage shall be arranged as specified in paragraph 3.2.1.

3.7.1.2 ㊴ CONSTRUCTION: The fuselage shall be basically of riveted, high strength aluminum alloy construction with bulkheads and beltframes and stressed-skin metal covering. Magnesium skins may be used where practicable. Corrosion and heat-resisting material shall be used where required in the engine section.

3.7.1.3 CREW AND PERSONNEL STATIONS:

3.7.1.3.1 ⑪ ⑫ The pilots' compartment shall include two ejection seats and dual flight controls. The power plant and accessory controls and instruments, flight instruments and armament controls are as specified herein. The instrument panel for both the student and instructor shall accommodate the pilot's display component of the fire control system. An optical sight shall be mounted directly above each instrument panel. The cockpit shall be arranged as agreed to by the mock-up board inspection.

3.7.1.3.2 The pilots' compartment shall be designed to be pressurized as specified in paragraph 3.20.1.1.1.

3.7.1.3.3 Separate ladders (ground handling equipment) shall be required for the student and instructor to enter and leave the airplane.

3.7.1.3.4 (290) (293) The pilots' compartment shall be equipped with a hinged canopy, which shall be manually operated for normal entrance and exit and which shall be capable of being jettisoned by means of a canopy remover actuated as a part of the seat ejection sequence for emergency exit in flight. An alternate means shall be provided for jettisoning the canopy in a manner that will not accomplish the pre-ejection arming of either seat. Additional provisions are installed for jettisoning of cockpit canopy externally. The external provisions are located on the left hand side of the fuselage to permit ground personnel to jettison the canopy when the aircraft is in either "wheels-up" or "wheels-down" position. An instruction stencil shall be installed adjacent to the external controls. External means for actuating the canopy latching mechanism shall be provided.

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 28

DATE 26 January 1956

CHANGE (ECP) NO. 1100R$_1$ MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Emergency speed brake and drag chute deployment. AMC ltr. MCPHFC(RDZSFG)1-2 WJM/jem dtd 13 October 1955. CCN #52 MSN 7N-1681, dtd 12 Sept. 1956; CCN #25 MSN 7N-1735, dtd 12 Sept. 1956.

CHANGE

FROM:

3.7.1.6 SPEED BRAKES: Two speed brake panels shall be provided. These shall be located in the fin island stub and shall house the drogue chute. The brakes shall be hydraulically operated with no pre-selected positioning provisions. Locks shall be provided for the closed position only. Means shall be provided to hold the speed brake doors open to prevent inadvertent actuation of the doors during maintenance.

TO:

3.7.1.6 SPEED BRAKES: Two speed brake panels shall be provided. These shall be located in the fin island stub and shall house the drogue chute. The brakes shall be hydraulically operated with no pre-selected positioning provisions. Locks shall be provided for the closed position only. Means shall be provided to hold the speed brake doors open to prevent inadvertent actuation of the doors during maintenance.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4038)

3.7.1.6 SPEED BRAKES: Two speed brake panels shall be provided. These shall be located in the fin island stub and shall house the drag chute. The brakes shall be hydraulically operated with no pre-selected positioning provisions. Locks shall be provided for the closed position only. Emergency operation shall be accomplished by means of the high pressure pneumatic system. Means shall be provided to hold the speed brake doors open to prevent inadvertent actuation of the doors during maintenance.

(Effective on A/C Ser. Nos. AF55-4039 thru 55-4059, 56-2317 thru 56-2379)

Effect on Weight:	+ 3.6 lb.
Effect on Balance:	+ 1537 in. lb.
Effect on Performance:	Negligible

AIRPLANES AFFECTED:

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 28 **DATE** 14 September 1956

CHANGE (ECP) NO. 515 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Canopy Glass, Stretched Plex - Installation of. CCN #256 MSN 7N-4803, dtd 29 Jan. 1957; CCN #114 MSN 7N-4804, dtd 29 Jan. 1957; CCN #84 MSN 7N-4805, dtd 29 Jan. 1957; CCN #62 MSN 7N-4806, dtd 29 Jan. 1957.

CHANGE

FROM:

3.7.1.3.6 The pilot's windshield shall be fabricated from tempered glass in accordance with Specification No. MIL-G-8602, except for whatever modification may be necessary to incorporate electrical anti-icing and defogging provisions. The pilot's canopy shall be fabricated from transparent material in accordance with AN-P-45, except as noted in Appendix II.

TO:

3.7.1.3.6 The pilot's windshield shall be fabricated from tempered glass in accordance with Specification No. MIL-G-8602, except for whatever modification may be necessary to incorporate electrical anti-icing and defogging provisions. The pilot's canopy shall be fabricated from transparent material in accordance with AN-P-45, except as noted in Appendix II.

(Effective on A/C Ser. Nos. AF54-1352, 54-1355 thru 54-1360, 54-1363 thru 56-1365)

3.7.1.3.6 The pilot's windshield shall be fabricated from tempered glass in accordance with Specification No. MIL-G-8602, except for whatever modification may be necessary to incorporate electrical anti-icing and anti-fogging provisions. The pilot's canopy shall be fabricated from transparent material in accordance with Contractor's Specification to be submitted to WADC for approval.

(Effective on A/C Ser. Nos. AF54-1351, 54-1353, 54-1354, 54-1361, 54-1362, 54-1366 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

Effect on Weight:	- 4.0 lbs.
Effect on Balance:	- 680 in. lbs.
Effect on Performance:	Will be accumulated with other changes and reported at a later date.

AIRPLANES AFFECTED:

BY

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FORM 618C

3.7.1.3.5 The maximum practicable hemispherical visibility shall be provided to either side of the forward line of sight, and to either side above and below the line of sight. The forward and downward visibility over the nose shall be not less than 15° to the wing chord plane.

3.7.1.3.6 ⑧ ⑨ The pilots' windshield shall be fabricated from tempered glass in accordance with Specification No. MIL-G-8602 for flat glass and MIL-G-7767 for curved glass, except for whatever modification may be necessary to incorporate electrical anti-icing and defogging provisions. The pilots' canopy shall be fabricated from transparent material in accordance with AN-P-45, except as noted in Appendix II.

3.7.1.3.7 The cockpit configuration shall be arranged to accommodate two ejection seats approved by WADC.

3.7.1.4 CARGO COMPARTMENTS: Not applicable.

3.7.1.5 EQUIPMENT COMPARTMENTS: Provisions shall be made to install the equipment as specified in paragraph 3.2.1. Ready access shall be provided for all components requiring adjustment and preflight checks.

3.7.1.6 SPEED BRAKES: Two speed brake panels shall be provided. These shall be located in the fin island stub and shall house the drogue chute. The brakes shall be hydraulically operated with no preselected positioning provisions. Locks shall be provided for the closed position only. Means shall be provided to hold the speed brake doors open to prevent inadvertent actuation of the doors during maintenance.

3.7.1.7 ROCKET AND MISSILE BAYS: Provisions to accommodate the armament as specified in Paragraph 3.2.13.1, shall be incorporated in the lower portion of the fuselage forward of the main landing gear.

3.7.1.8 WHEEL WELLS: Provision shall be made to house the nose wheel and portion of the two main wheel landing gear units in the fuselage.

3.7.1.9 ACCESSORY COMPARTMENT: Provisions shall be made to accommodate the installation of miscellaneous hydraulic, pneumatic, electrical and electronic equipment in the accessory compartment, which shall be located between the rocket bay and the main wheel wells.

3.7.2 HULL: Not applicable.

3.8 ALIGHTING GEAR:

⑮⑯⑰(205)

3.8.1 GENERAL DESCRIPTION AND COMPONENTS: The landing gear shall be of the retractable, tricycle type, consisting of a nose gear unit and two main gear units.

3.8.2 MAIN LANDING GEAR:

3.8.2.1 DESCRIPTION: The main landing gear shall consist of two units attached to the wing structure and retracting into wells in the wing and fuselage. Each unit shall include a shock absorber strut and one wheel, tire, tube and brake.

3.8.2.2 (139) (140) WHEELS, BRAKES AND BRAKE CONTROL SYSTEMS: The main wheels shall be 30 x 8.8, Type VII and shall be equipped with pneumatic brakes. The brakes shall be actuated by means of toe controls which form an integral part of the pilots' rudder pedals. The brake system shall be in accordance with Specification No. AN-B-2, except as noted in Appendix II. Anti-skid devices are not required.

3.8.2.3 TIRES AND TUBES: The main wheel tires and tubes shall be 30 x 8.8, Type VII.

3.8.2.4 (221) SHOCK ABSORBERS: Each main landing gear unit shall include one shock absorber strut designed in accordance with Specification No. 40228J (4) and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

3.8.2.5 ⑲㊷㊿ (271) RETRACTING, EXTENDING AND LOCKING SYSTEMS: The main landing gear shall be hydraulically retracted and extended by means of controls located convenient to the student and instructor. Safety devices shall be provided to prevent inadvertent retraction of the main landing gear when the airplane is on the ground. Positive mechanical locks shall be provided in both the extended and retracted positions. (Retracted gear is locked by doors.)

3.8.2.6 ⑳ DOORS AND FAIRINGS: Hinged doors and fairings shall be provided to cover the main landing gear wells in the fuselage and wing.

3.8.2.7 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the main landing gear units requiring inspection, maintenance and servicing including lubrication, and for removal and replacement of parts subject to wear in service.

3.8.3 AUXILIARY LANDING GEAR (Tail Wheel): Not applicable.

3.8.4 ⑭ AUXILIARY LANDING GEAR (Nose Wheel):

3.8.4.1 DESCRIPTION: The nose landing gear shall consist of a single steerable unit attached to the fuselage structure and retracting into a well in the nose. This unit shall include a shock absorber strut, steer damp unit and one wheel, tire and tube.

3.8.4.2 WHEEL: The nose wheel shall be 24 x 5.5, Type VII.

3.8.4.3 TIRE AND TUBE: The nose wheel tire and tube shall be 24 x 5.5, Type VII EHP.

3.8.4.4 (221) SHOCK ABSORBER: The nose landing gear unit shall be equipped with one shock absorber strut designed in accordance with Specification No. 40228J (4), and tested in accordance with Specification No. MIL-T-6053, except as noted in Appendix II.

3.8.4.5 RETRACTING, EXTENDING AND LOCKING SYSTEMS: The nose landing gear unit shall be hydraulically retracted and extended by means of the controls specified in paragraph 3.8.2.5. Safety devices shall be provided to prevent inadvertent retraction of the nose landing gear when the airplane is on the ground. A positive mechanical lock shall be provided in both the extended and retracted positions.

3.8.4.6 ⑳ DOORS AND FAIRINGS: A hinged door shall be provided to enclose the nose wheel well in the nose of the fuselage.

3.8.4.7 STEERING CONTROL: Provision shall be made for hydraulically steering the nose wheel by means of either set of rudder pedals acting together. The nose wheel shall be steerable through 50° right or left. At 55° right or left the steer damp unit shall automatically disengage and permit swiveling through 360°.

3.8.4.8 INSPECTION AND MAINTENANCE: Provision shall be made for access to those parts of the nose landing gear unit requiring inspection, maintenance and servicing, including lubrication, and for removal and replacement of parts subject to wear in service.

3.8.5 IN FLIGHT OPERATING CONDITIONS: Positive operation shall be available during level flight at all speeds up to $V_c = 270$ knots, and during accelerated flight operation ($n_z = 2.0$) up to $V_c = 240$ knots.

3.9 ALIGHTING GEAR (Water Type): Not applicable.

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Page 1 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 32

DATE 24 July 1956

CHANGE (ECP) NO. 529

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC wire MCPHFC(RDZSFG) 1622 dated 10 April 1956. Vertical Tail - Change to. Reference ECP 1131. CCN #117 MSN 7N-5263 dtd 13 Feb. 1957; CCN #91 MSN 7N-5264 dtd 28 Feb. 1957; CCN #69 MSN 7N-5265 dtd 28 Feb. 1957.

CHANGE

FROM:

3.10.1 PRIMARY FLIGHT CONTROL SYSTEM: The primary flight control system shall be an irreversible, full-hydraulic system, including artificial feel and trimming devices. The irreversible power actuators shall also serve as the surface actuators during automatic flight, and shall be designed to function in conjunction with the fire control system to provide satisfactory airplane performance during all automatic flight operations. A dual hydraulic power system shall be provided as described in Paragraph 3.15.1. The control system shall be in accordance with Handbook of Instructions for Aircraft Designers (HIAD), except as noted in Appendix II.

TO:

3.10.1 PRIMARY FLIGHT CONTROL SYSTEM: The primary flight control system shall be an irreversible, full-hydraulic power system, including artificial feel and trimming devices. The irreversible power actuators shall also serve as the surface actuators during automatic flight, and shall be designed to function in conjunction with the fire control system to provide satisfactory airplane performance during all automatic flight operations. A dual hydraulic power system shall be provided as described in Paragraph 3.15.1. The control system shall be in accordance with Handbook of Instructions for Aircraft Designers (HIAD), except as noted in Appendix II.

(Effective on A/C Ser. Nos. AF54-1351, 54-1352, 54-1354, 54-1358 thru 54-1360)

ADD:

3.10.1 PRIMARY FLIGHT CONTROL SYSTEM: The primary flight control system shall be an irreversible, full-hydraulic power system, including artificial feel and trimming devices. The irreversible power actuators shall also serve as the surface actuators during automatic flight, and shall be designed to function in conjunction with the fire control system to provide satisfactory airplane performance during all automatic flight operations. The maximum allowable aileron stick deflection for the flight regime above 450 knots IAS

AIRPLANES AFFECTED:

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Page 2 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 32 (Cont) DATE 24 July 1956

CHANGE (ECP) NO. 529 MODEL TF-102A REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC wire MCPHFC(RDZSFG) 1622 dated 10 April 1956. Vertical Tail - Change to. Reference ECP 1131. CCN #117 MSN 7N-5263 dtd 13 Feb. 1957; CCN #91 MSN 7N-5264 dtd 28 Feb. 1957; CCN #69 MSN 7N-5265 dtd 28 Feb. 1957

CHANGE

ADD: (Cont)

3.10.1 (Cont) and below 20,000 ft. shall be indicated by an abrupt increase in aileron feel force on each stick. A dual hydraulic power systen shall be provided as described in Paragraph 3.15.1. The control system shall be in accordance with Handbook of Instructions for Aircraft Designers (HIAD), except as noted in Appendix II.

(Effective on A/C Ser. Nos. AF54-1353, 54-1355 thru 54-1357, 54-1361 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

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3.10 ㊸ (57) SURFACE CONTROL SYSTEM:

3.10.1 ㊹ ㊻ ㊼ (56) (157) PRIMARY FLIGHT CONTROL SYSTEM: The primary flight control system shall be an irreversible, full-hydraulic power system, including artificial feel and trimming devices. The irreversible power actuators shall also serve as the surface actuators during automatic flight, and shall be designed to function in conjunction with the fire control system to provide satisfactory airplane performance during all automatic flight operations. A dual hydraulic power system shall be provided as described in paragraph 3.15.1. The control system shall be in accordance with Handbook of Instructions for Aircraft Designers (HIAD), except as noted in Appendix II.

3.10.1.1 ㊽ FLIGHT STATION CONTROLS: The cockpit elements of the flight control system shall include dual rudder pedals and dual control sticks.

3.10.1.1.1 The student's and instructor's control sticks shall each include complete provisions for the installation of double grip type control stick heads. The control sticks heads shall be contractor furnished for those aircraft not requiring installation of a fire control system. For those aircraft which require a fire control system the control stick heads shall be furnished as a part of the fire control system. (See Para. 3.17.4.7 1)

3.10.2 SECONDARY FLIGHT CONTROL SYSTEMS:

3.10.2.1 LIFT AND DRAG INCREASING DEVICE SYSTEMS: Duplicate provisions for the release and jettison of the drogue parachute shall be installed in the cockpit conveniently located for use by each pilot.

3.10.2.2 SPEED BRAKES: Provision shall be made to extend and retract the speed brakes by a switch located on each throttle control lever. Instructor's switch shall override the student's switch.

3.10.3 (289) TRIM CONTROL SYSTEMS: The primary flight control system shall include trimming devices operable by the student through trim switches in the cockpit. The instructor shall have elevon trim control only. When on automatic flight control system, the elevator trimming device shall automatically operate in such a manner as to prevent objectionable control stick and surface motion when the automatic control system is disengaged. Provisions shall be made, for the student only, to automatically place the trim system in take-off configuration by the operation of a single control located in the cockpit. Achievement of take-off trim shall then be indicated by a green light.

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3.10.4 AUTOMATIC FLIGHT CONTROL DEVICES: Automatic flight control devices shall consist of the following systems.

3.10.4.1 PITCH AND YAW DAMPER SYSTEM: The function of this system shall be to augment the airplane dynamic stability. This system is applicable for all modes of operation (i.e. manual or automatic fire control) except direct manual. Means shall be provided available to either pilot to disengage the pitch and yaw damper system and switch to the direct manual mode of flight control.

3.10.4.2 PILOT ASSIST SYSTEM: A separate pilot assist system will not be provided. This mode of operation will be included in the automatic flight control system (AFCS) (Ref. Paragraph 3.10.4.4).

3.10.4.3 PITCH G-LIMITER: The function of this system shall be to sense the approach of excessive normal load factors and shut-off the pitch and yaw damper system and automatic fire control system in time to prevent structural damage to the airplane.

3.10.4.4 AUTOMATIC FLIGHT CONTROL SYSTEM: Complete provisions for the automatic flight control system (AFCS) portion of the fire control system shall be incorporated so that when installed, the system will permit automatic flight control of the airplane during the interception phase of attack following radar lock on. This system shall also independently provide either pilot with a means of holding the airplane attitude constant for short periods of time. This mode of operation shall be available to either pilot through manually controlled switches during normal flying (i.e., radar turned off) or the search phase.

3.10.5 MODES OF FLIGHT CONTROL: For the purpose of this specification the modes of operation shall be as follows:

3.10.5.1 DIRECT MANUAL: The direct manual mode of operation shall consist of control surface inputs by the pilots only. This is not intended to be a normal mode of operation.

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3.10.5.2 MANUAL: The manual mode of operation shall consist of simultaneous control surface inputs by either pilot and the pitch and yaw damper system.

3.10.5.3 PILOT ASSIST (MG-9): In the pilot assist mode of operation the rudder inputs are as in the manual mode and the elevon inputs originate from the pitch damper and pilot assist systems.

3.10.5.4 AUTOMATIC FIRE CONTROL: In the automatic fire control mode of operation the rudder inputs are as in the manual mode and the elevon inputs originate from the fire control computer.

3.11 (84) (92) (96) (98) ENGINE SECTION: The aft section of the fuselage shall be designed to accommodate the turbo-jet engine specified herein. The engine shall be shrouded and insulation shall be provided as necessary for cooling and fire protection purposes.

3.11.1 DESCRIPTION AND COMPONENTS: The engine section is located in the aft section of the fuselage and designed to accommodate the specified turbo-jet engine.

3.11.2 CONSTRUCTION: See paragraph 3.7.1.2, Fuselage Construction.

3.11.3 ENGINE MOUNTS: Provision shall be made to mount the specified turbo-jet engine.

3.11.4 VIBRATION ISOLATORS: Vibration isolators are not required.

3.11.5 (91) (95) (96) (132) FIREWALLS: A vertical athwartship airframe firewall shall not be required. For fire protection the engine shall be encased within an insulated fire resistant cannular shroud extending from the engine firewall aft. A longitudinal vertical firewall shall be installed between the wing fuel tanks and engine compartment from bulkhead 481 to 553 between the upper and lower wing attach angles. Firewalls may be constructed of titanium or titanium alloys. Fire resistant shrouds shall be installed around the fuel shut-off valves, and provided with overboard drains.

3.11.6 COWLING AND COWL FLAPS: Not required.

3.11.7 ACCESS FOR INSPECTION AND MAINTENANCE: Removable panels and hinged doors shall be provided as required for access to the engine installation for inspection and maintenance.

3.11.8 (97) FIRE ACCESS DOORS: A spring-loaded fire access door shall be provided in the fuselage to accommodate rapid insertion of a ground fire extinguisher nozzle.

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SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 36 DATE 4 April 1957

CHANGE (ECP) NO. 1223R$_1$ MODEL TF-102A REVISED 18 October 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Afterburner Recirculating Igniter Valve - Revision of. Pratt and Whitney ECP 69123C. CCN 8N-1753(150)

CHANGE

FROM:

3.12.2.1 "The airplane shall be equipped with one Pratt and Whitney J57-P-23 turbo-jet engine ....."

TO:

3.12.2.1 "The airplane shall be equipped with one Pratt and Whitney J57-P-23 turbo-jet engine ....."

(Effective on A/C Ser. Nos. 54-1351 thru 56-2331)

3.12.2.1 The airplane shall be equipped with one Pratt and Whitney J57-P-23A turbo-jet engine in accordance with Pratt and Whitney Specification No. A-1686-F, Amendment I, rated at 16,000 pounds thrust, static at sea level. The engine shall be in accordance with Pratt and Whitney Drawing No. 229001 change AJ-1. dated 31 January 1957. Any future revisions that affect materially the J57-P-23A installation shall be submitted to the Wright Air Development Center and the Contractor, in the form of Engineering Change Proposal, for approval.

(Effective on A/C Ser. Nos. 56-2332 thru 56-2379)

AIRPLANES AFFECTED:

BY N. A. Young Jr.

APPROVED BY B. W. Carlson 4/11

FORM 618C

3.12 PROPULSION:

3.12.1 GENERAL DESCRIPTION AND COMPONENTS: The propulsion group includes the turbo-jet engine specified below, the required accessories, and related systems. Engine inlet screen will not be required.

3.12.2 MAIN PROPULSION UNIT:

3.12.2.1 The airplane shall be equipped with one Pratt & Whitney J57-P-23 turbo-jet engine in accordance with Pratt & Whitney Specification No. A-1686, and rated at 16, 000 pounds of thrust, static at sea level. The engine shall be in accordance with Pratt & Whitney Drawing No. 229001, no change ltr. (Drawing No. 208301 change ltr. BG-2 to be used until Dwg. No. 229001 becomes available). Any future revisions that affect materially the J57-P-23 installation shall be submitted to the Wright Air Development Center and the Contractor, in the form of Engineering Change Proposal, for approval.

3.12.3 AUXILIARY PROPULSION UNIT: Not required.

3.12.4 ENGINE-DRIVEN ACCESSORIES: Two hydraulic pumps and one tachometer generator shall be installed on and driven by the engine. A constant speed accessory drive shall be driven by the engine through a gear and drive shaft arrangement.

3.12.5 AIR INDUCTION SYSTEM: Air inlets, with boundary layer air ducts and plows shall be located on each side of the fuselage adjacent to the pilots' compartment with ducts extending aft to the engine. The air inlet duct lips shall have provisions for anti-icing as specified in paragraph 3.20.2.1.

3.12.6 EXHAUST SYSTEM: The engine shall be furnished complete with exhaust system, including afterburner with a two position, flap type nozzle.

3.12.7 COOLING SYSTEM: Adequate cooling for the engine, engine accessories, aircraft equipment, components and structure shall be provided.

(99) (100)
(101)

3.12.7.1 In addition to the cooling air, supplementary protection is afforded the fuselage structure from overheat by the insulated shroud. (Reference paragraph 3.11 and 3.11.5).

3.12.8 LUBRICATING SYSTEM:

(102)

3.12.8.1 DESCRIPTION AND COMPONENTS: The spcified engine shall be furnished complete with lubricating system, including oil tank, oil-fuel heat exchanger (oil cooler), pumps, lines, strainer and valves. An additional air/oil cooler shall be provided by the Contractor to maintain required oil temperature.

(89) (103) thru (108)

3.12.8.1.1 A suitable access door shall be provided for oil tank servicing.

(81) (90)

3.12.9 FUEL SYSTEM:

(112)

3.12.9.1 DESCRIPTION AND COMPONENTS: The fuel system shall include tanks, lines, pumps, valves and controls. The system shall be designed for the use of fuels conforming to Specification No. MIL-F-5624A, Grade JP-4. The fuel system shall include the provisions specified in paragraph 3.5.2.5 to accommodate the installation and use of external fuel tanks. The system shall be placarded as to use of MIL-F-5572 gasoline as an emergency fuel and airplane performance limitations shall be included thereon.

(109) (110) (115)

3.12.9.2 PUMPS: Two alternating current, electric motor-driven fuel booster pumps, conforming to Specification MIL-P-5238, shall be provided in the wing fuel tanks. Other pumps shall be as furnished with specified engine.

(114)

3.12.9.3 TANKS - (Fixed): Two fuel tanks (one in each wing) consisting of three inter-connected compartments each, with a total net capacity of 1050 gallons (±2%) shall be provided as an integral part of the wing structure.

(77) (78) (85)
(86) (87) (93)

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SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 38 DATE 5-26-55

CHANGE NO. 1028R1 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903,-29264 &-31174

AUTHORITY AND REASON FOR CHANGE: Customer requested as stated in AMC teletype P231957Z, SD551 dtd 23 March 1955. CCN #6N-1865(193) CCN #6N-1866(48) CCN #6N-430(6).

PARAGRAPH NO. CHANGE

3.12.9.4 Change to read as follows:

TANK - (Jettisonable): Complete provisions for and installation of the standard USAF 230 gallon external jettisonable fuel tanks, AF Drawing 54J22660. The provisions shall accommodate the installation of a tank on the lower surface of the wing on both the left and right hand side. Means shall be provided to automatically shut-off the transfer pressurization system when the tanks are empty. The pylons and tanks shall be jettisonable, at pilot's option.

Effective on A/C Ser, Nos, AF54-1351, -1354 and 54-1361 thru 54-1370
55-4032 thru 55-4059.

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 6188.2

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3.12.9.4 TANKS - (Jettisonable): Space and structural provisions shall be made to accommodate the installation and functioning of jettisonable external fuel tank kits, designed to accommodate use of the standard USAF 225 gal tanks, AF Drawing X53J9555. The kits shall include the pylons, ejector, attaching and release mechanism, wiring, switches, plumbing and air pressure lines. The provisions shall accommodate the installation of one tank kit, on the lower surface of the wing on both the left and right hand side. Means shall be provided to automatically shut-off the transfer pressurization system when the tanks are empty. The pylons and tanks shall be jettisonable, at the pilots' option.

3.12.9.5 (88) (111) (113) VENT SYSTEM: The fuel tanks shall be vented in a manner consistent with fuel tank pressurization requirements. The vent system shall include the required lines, fittings, valves and equipment.

3.12.9.6 (71) thru (76) PIPING AND FITTINGS: Aluminum alloy fuel lines may be used throughout the fuel system. A shut-off valve protected by a fire resistant shroud, shall be provided at each wing tank outlet. All piping and connections in the fuel system shall be in accordance with applicable specifications and installed in accordance with the requirements of the HIAD, except as specified in Appendix II.

3.12.9.7 VALVES: Valves shall be provided as required and shall be in accordance with applicable specifications.

3.12.9.8 (116) STRAINERS AND FILTERS: A No. 8 mesh screen shall be installed in the fuel line near the engine.

3.12.9.9 (80) (277) (280) (281) QUANTITY GAGES AND FLOWMETERS: A single instantaneous rate expanding scale type flowmeter shall be provided for the turbine jet portion only. A fuel quantity gage compensated characterized type which is in general accord with Specification MIL-G-7818 except as noted in Appendix II, shall be provided. The quantity gage shall be installed in accordance with Specification MIL-G-7940, except as noted in Appendix II. Individual compartment reading by selection switching arrangement shall not be required. The fuel gage in normal position shall totalize all fuel in the integral tanks. Selective switching shall permit the gage to indicate quantity of fuel in either the #3 compartment left hand wing tank or the #3 compartment right hand wing tank.

3.12.9.9.1 LOW LEVEL WARNING: A fuel low-level warning shall be provided, which is actuated by means other than the gage.

3.12.9.10 DRAINAGE PROVISIONS: Provision shall be made to drain fuel from the tanks.
(94)

3.12.9.11 FUEL EVAPORATION AND TRANSFER CONTROL: Air shall be bled from the engine compressor section and shall be used to pressurize the fuel tanks to reduce fuel evaporation and to provide fuel transfer.

3.12.9.12 REFUELING PROVISIONS: Pressure refueling provisions shall comply with the requirements set forth in Memorandum Report No. MCREXP-524-3006 with the exception of suction defueling as noted below, and deviations noted in Appendix II.
(79)

3.12.9.13 DEFUELING PROVISIONS: The fuel booster pumps shall be used for defueling on the ground.
(89) (282) thru (286)

3.12.10 WATER INJECTION SYSTEM: Not applicable.

3.12.11 PROPULSION SYSTEM CONTROLS: A power control lever shall be provided on the left hand console for the student, another on the right hand console for the instructor and connected to the power lever on the specified engine.
(51) (52)

3.12.11.1 A switch shall be provided on both the student's and instructor's throttle quadrant which shall permit either pilot to independently switch to the emergency regime in the engine fuel system. For normal regime of the fuel system, both switches must be in the normal position.

3.12.12 STARTING SYSTEM: The starting system shall include an air turbine starter requiring an external source of compressed air. The main engine starting controls shall be located for use by the student. The starter pressure regulating and shut-off valve shall not be required on the aircraft.

3.12.13 PROPELLER: Not applicable.

3.12.14 ROCKET PROPULSION SYSTEM: Not required.

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 40 **DATE** 10 November 1955

CHANGE (ECP) NO. $512R_1$ **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC request to provide combustion starter installation in subject airplanes in lieu of pneumatic starter. Supp. Agrm. #33, Cont. -23903 Supp. Agrm. #27 Cont. -29264; CCN #31 MSN 7N-2575 dtd 16 Oct. 1956.

CHANGE

FROM:

3.13 AUXILIARY POWER PLANT: The airplane shall be designed to receive compressed air for ground starting from a type MA-1 power unit, or equivalent, except as modified by Paragraph 3.12.12 herein.

3.13.1 A quick disconnect fitting located in the right hand wheel well, shall be provided for use with the ground compressor. This fitting is used for connecting air duct from ground compressor for engine starting.

TO:

3.13 AUXILIARY POWER PLANT: The airplane shall be designed to receive compressed air for ground starting from a type MA-1 power unit, or equivalent, except as modified by Paragraph 3.12.12 herein.

3.13.1 A quick disconnect fitting located in the right hand wheel well, shall be provided for use with the ground compressor. This fitting is used for connecting air duct from ground compressor for engine starting.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1357)

3.13 Not applicable.

3.13.1 Not applicable.

(Effective on A/C Ser. Nos. AF54-1358 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY R A Martin

APPROVED BY

FORM 618C

3.13 AUXILIARY POWER PLANT: The airplane shall be designed to receive compressed air for ground starting from a type MA-1 power unit, or equivalent, except as modified by paragraph 3.12.12 herein.

3.13.1 A quick disconnect fitting located in the right hand wheel well, shall be provided for use with the ground compressor. This fitting is used for connecting air duct from ground compressor for engine starting.

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FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 41

DATE 4 November 1955

CHANGE (ECP) NO. 1075

MODEL TF-102A

REVISED 19 October 1956

CONTRACT AF33(600)-23903

AUTHORITY AND REASON FOR CHANGE: Contractor requested due to certain specific requirements in flight testing of specific aircraft. CCN #59 MSN 6N-3498, dtd 12-5-55.

- -

CHANGE

CHANGE:

3.14.1.1 STUDENT INSTRUMENTS:

FROM:

@ One Attitude Gyro

TO:

@ Not applicable

ADD:

Ø One Attitude Remote Indicator

CHANGE: INSTRUCTORS INSTRUMENTS:

FROM:

@ One Attitude Gyro

TO:

@ Not applicable

ADD:

Ø One Attitude Remote Indicator

Effect on Weight: + 29.2 lbs.
Effect on Balance: + 7102 in. lbs.
Effect on Performance: Negligible, will be accumulated with that of other changes and reported at a later date.

@ Effective on A/C Ser. Nos. AF54-1353 thru 54-1360.
Ø Effective on A/C Ser. Nos. AF54-1353 thru 54-1360.

AIRPLANES AFFECTED:

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 41

DATE 4 June 1956

CHANGE (ECP) NO. 525

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Accelerometer - Addition of, AMC wire 27/1838Z March 1956 (MCPHFC/RDZSFG/3-38-E). CCN #60 MSN 7N-2574 & CCN #31 MSN 7N-2575, dtd 16 Oct. 1956

CHANGE

Paragraph

3.14.1.1 STUDENT INSTRUMENTS:

ADD: One Accelerometer
(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059 & 56-2317 thru 56-2379)

Effect on Weight: +1.6 lb
Effect on Balance: +237 in lb
Effect on Performance: Will be accumulated with that of other changes and reported at a later date.

AIRPLANES AFFECTED:

BY RA Martin

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SPECIFICATION CHANGE NOTICE
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SPEC. NO. ZD-8-004A

FILE OPP. PG. NO 41 DATE 12 July 1955

CHANGE NO. 1015R$_2$ MODEL TF-102A REVISED 25 August 1955

CONTRACT AF33(600)-23903 & 29264

AUTHORITY AND REASON FOR CHANGE: AMC-TWX MCPHFC/WCSFB-3-3-E 3-4-55
Dayton TWX MSG. NO. 74 3-4-55, AMC LTR. MCPHFC (WCSFG) 1-2/RGA/jc
4-15-55, RFA NO. 84 of CTCI BOARD 5-27-55
CCN #35 ESN 6N-494 dtd 25 July 1955, CCN #5 ESN 6N-431 dtd 25 July 1955

CHANGE:

3.14.1.1 INSTRUMENTS:

FROM: One Attitude Gyro
One Outside Air Temperature Indicator

TO: @ One Attitude Gyro
@ One Outside Air Temperature Indicator

ADD: Ø One Attitude Indicator

3.14.1.2 INSTRUCTOR INSTRUMENTS:

FROM: One Attitude Gyro

TO: @ One Attitude Gyro

ADD: Ø One Attitude Indicator

@ A/C Serial No. 54-1351 thru 54-1360
Ø A/C Serial No. 54-1361 thru 54-1370 & 55-4032 thru 55-4059

AIRPLANES AFFECTED: Noted

BY

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3.14 INSTRUMENTS AND NAVIGATION EQUIPMENT:

3.14.1 INSTRUMENTS:

(49) (117) (121)

3.14.1.1 STUDENT INSTRUMENTS: The following instruments shall be located on the student's instrument panel, subpanel, console, or as specified herein:

One combination air speed indicator and Machmeter
One altimeter
One attitude gyro
One rate-of-climb indicator
One turn and slip indicator
One radio magnetic course indicator
One course deviation indicator (ID-351)
One pilot's display (part of fire control system)
One fuel quantity indicator and selector switch
One clock
One cabin pressure altimeter
One single hydraulic pressure indicator and selector switch
One fuel flow indicator
One tachometer
One turbine outlet temperature indicator
One alternating current voltmeter and selector switch
Three landing gear position indicators
One engine pressure ratio gage
One outside air temperature indicator
One magnetic stand-by compass (in canopy)
One afterburner position indicator

3.14.1.2 INSTRUCTOR INSTRUMENTS: The following instruments shall be located on the instructor's instrument panel:

One course deviation indicator (ID-48)
One pilot's display (part of fire control system)
One radio magnetic course indicator
One combination air speed indicator and machmeter
One altimeter
One attitude gyro
One rate-of-climb indicator
One turn and slip indicator

3.14.2 NAVIGATION EQUIPMENT: See Section 3.17.

3.14.3 INSTALLATION: Instruments shall be installed in accordance with the HIAD, and other applicable specifications, except as noted in Appendix II. The pitot tube shall be installed in accordance with MIL-I-5072 and shall be located on a boom extending forward from the tip of the radome. Provisions shall be made for operation of the integral electric heater.

(118) (119)
(120) (123)
(168)
thru
(171)
(218)
(247)
(248)

3.15 HYDRAULIC AND PNEUMATIC SYSTEMS:

3.15.1 HYDRAULIC SYSTEM:

3.15.1.1 (198) thru (202) (206) (214) DESCRIPTION AND COMPONENTS: The hydraulic systems shall be in accordance with Specification No. MIL-H-5440, except as noted in Appendix II. The hydraulic configuration shall consist of two separate continuously-operating, closed center systems. The systems shall be of equivalent capacity, each developing approximately one-half the full hinge moment. Each system shall be powered by an engine-driven 3000-psi, variable volume pump. One system will be considered as the primary system, to be used for controls only. The other system will be known as the secondary system, to be used for controls plus utility items such as landing gear, speed brakes, emergency A.C. generator, and nose wheel steering. Dual-tandem cylinders shall be provided on the elevons. A single tandem cylinder shall be provided on the rudder. Dual control valves shall be provided for each surface. The primary and secondary systems need not and shall not be interconnected, except mechanically, at the surface control valve and actuating cylinders. Either system shall be capable of flying the airplane equally well under reduced maneuverability in the event of failure of the other. All utility items, when not in use, shall be shut off from the secondary system. If the primary system is inoperative, the landing gear may be lowered by an emergency method, thus relieving possibility of failure of the secondary system at landing. To provide for failure of the power plant, which is the only source of continuous power for the control systems, an emergency hydraulic pump driven by a ram air turbine will supply power to the primary hydraulic system for controls. The ram air turbine will be used to provide hydraulic power to permit landing the airplane and at flight speeds where windmilling engines will not provide sufficient power to the engine driven hydraulic pumps. Hydraulic pumps shall be approved by Wright Air Development Center.

3.15.1.2 SUMMARY OF ACTUATED ITEMS: The hydraulic system shall be used to actuate the following items:

Surface control system
Landing gear extension and retraction and doors
Speed brakes
Nose wheel steering
Emergency A.C. generator.

3.15.2 PNEUMATIC SYSTEMS:

(54) (207) thru (213)

3.15.2.1 LOW PRESSURE PNEUMATIC SYSTEM: A low pressure pneumatic system shall be installed for air conditioning, as described under paragraph 3.20.

3.15.2.1.1 SUMMARY OF FUNCTIONS: The low pressure pneumatic system shall provide:

Hydraulic Reservoir Pressurization
Cabin pressurization and air conditioning
Fuel tank pressurization
Air intake duct anti-icing
Canopy seal pressurization
Anti "G" suit pressurization
Windshield spot rain clearing
Glycol tank pressurization
Elevon feel intelligence system pressure.

3.15.2.2 HIGH PRESSURE PNEUMATIC SYSTEM: A high pressure pneumatic system shall be provided in accordance with Specification No. MIL-P-5518, except as noted in Appendix II.

3.15.2.2.1 DESCRIPTION AND COMPONENTS:

The high pressure pneumatic system obtains its energy from air stored in the air flasks which are charged to 3000 psi from a ground source. A pressure regulator reduces and regulates the air pressure for use in the armament and rudder feel systems. The

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 45

DATE 26 January 1956

CHANGE (ECP) NO. 1100R$_1$

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Emergency speed brake and drag chute deployment. AMC ltr. MCPHFC(RDZSFG)1-2 WJM/jem dtd 13 October 1955. CCN #52 MSN 7N-1681, dtd 12 Sept. 1956; CCN #25 MSN 7N-1735, dtd 12 Sept. 1956.

CHANGE

3.15.2.2.1.1 SUMMARY OF ACTUATED ITEMS:

ADD: Emergency speed brake operation:

(Effective on A/C Ser. Nos. AF55-4039 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 45

DATE 10 November 1955

CHANGE (ECP) NO. 512B$_1$

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC request to provide combustion starter installation in subject airplanes in lieu of pneumatic starter. Supp. Agrm. #33, Cont. -23903 & Supp. Agrm. #27, Cont. -29264; CCN #31 MSN 7N-2575, dtd 16 Oct. 1956.

CHANGE

3.15.2.2.1 DESCRIPTIONS AND COMPONENTS: (Cont)

Last sentence:

FROM: Sufficient pressure and volume shall remain to operate emergency lowering of the landing gear, extension of the ram air turbine, operation of the drogue chute and wheel brakes.

TO: Sufficient pressure and volume shall remain to operate emergency lowering of the landing gear, extension of the ram air turbine, operation of the drag chute and wheel brakes.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1357)

Sufficient pressure and volume shall remain to make one (1) ground start cycle and to operate emergency lowering of the landing gear, extension of the ram air turbine, operation of the drag chute and wheel brakes.

(Effective on A/C Ser. Nos. AF54-1358 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

3.15.2.2.1.1 SUMMARY OF ACTUATED ITEMS: "The high pressure ....."

ADD: Combustion starter

(Effective on A/C Ser. Nos. AF54-1358 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

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FORM 618C

3.15.2.2.1 DESCRIPTION AND COMPONENTS: (Cont)

normal capacity of the high pressure pneumatic system shall be capable of three cycles of armament door operation and one cycle of all armament displacement racks. For the alternate loading of the armament racks the capacity of the high pressure pneumatic system shall be capable of four cycles of armament door operation and two cycles of all armament displacement racks. Sufficient pressure and volume shall remain to operate emergency lowering of the landing gear, extension of the ram air turbine, operation of the drogue chute and wheel brakes.

3.15.2.2.1.1 SUMMARY OF ACTUATED ITEMS: The high pressure pneumatic system shall be used to actuate the following items:

Emergency landing gear extension
Armament displacement gear
Main landing gear brakes
Armament bay doors
Ram air turbine unlatch and extension
Rudder feel system cylinder
Drogue chute release

3.16 ELECTRICAL:

3.16.1 **DESCRIPTION:** The electrical system shall consist of a 28-volt direct current power supply and a 115/200 volt, 400 cycle three-phase alternating current power supply. Provisions shall be made for emergency operation of essential A.C. and D.C. loads. Emergency operation of essential A.C. loads shall be from a hydraulic driven A.C. generator.

3.16.2 ELECTRICAL POWER SUPPLY:

3.16.2.1 (258) (262) thru (267) **DIRECT CURRENT:** Direct current shall be supplied by a 200 ampere, 30-volt air cooled generator which shall be driven from an accessory gear pad on the input side of a constant speed drive. The input gear box shall be driven from the engine through a suitable gear and drive shaft arrangement. The generator and control panel shall be in accordance with Contractor Specification 8-06370. The distribution system shall include an "essential" and a "non-essential" bus with provisions for automatically disconnecting the "non-essential" bus in event of generator failure. A 24-volt, 24 ampere-hour battery shall be installed and connected to the essential bus. Means shall be made to inspect battery fluid level and to check specific gravity of the fluid. Provision for voltage adjustment in flight is not required. Provision shall be made to adjust the voltage safely while the aircraft is on the ground.

3.16.2.2 **ALTERNATING CURRENT:** The alternating current power shall be supplied by a 30 KVA, 120/208 volt, three-phase, air cooled A.C. generator driven by a hydro-mechanical constant speed drive. The constant speed drive shall be driven from the engine through a suitable gear and drive shaft arrangement as specified in paragraph 3.12.4, and shall be controlled to maintain the frequency of the A.C. generator to within ±1.0 percent. The generator, regulator and control panel shall be in accordance with Contractors Specification 8-06371.

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 47 DATE 31 August 1956

CHANGE (ECP) NO. 536 MODEL TF-102A REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: AN/ARC-34 System-Emergency Operation of (RFA #30 of the TF-102A). CCN #38 MSN 7N-3072, dtd 20 Nov. 1956.

CHANGE

FROM:

3.16.3.2.1 DIRECT CURRENT: In the event of failure of the airplane D.C. generator, power shall be supplied for the essential bus only, from the battery.

TO:

3.16.3.2.1 DIRECT CURRENT: In the event of failure of the airplane D.C. generator, power shall be supplied for the essential bus only, from the battery.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059 & 56-2317 thru 56-2354)

ADD:

3.16.3.2.1 DIRECT CURRENT: In the event of failure of the airplane D.C. generator, power shall be supplied for the essential bus only, from the battery. The AN/ARC-34 will be connected to the D.C. non-essential bus. In the event of failure of the main D.C. system, the AN/ARC-34 will be automatically transferred to the A.C. essential bus through a transformer-rectifier unit. In the event of a simultaneous D.C. and A.C. main system failure, the transformer-rectifier, as one of the A.C. essential loads, will be automatically transferred to the A.C. emergency generator by existing relays.

(Effective on A/C Ser. Nos. AF56-2355 thru 56-2379)

Effect on Weight:	+11.0 lb
Effect on Balance:	+2225 in lb
Effect on Performance:	Will be accumulated with other changes and reported at a later date.

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

3.16.3 ELECTRICAL POWER CONVERSION:

3.16.3.1 INSTRUMENT POWER: Instrument power shall be supplied by a 200/115-volts, three-phase transformer. This power shall be used to operate the electrically-driven alternating current gyro instruments. A 115/26V single-phase transformer shall be installed for autosyn instruments and J-2 compass system. These transformers shall receive power from the airplane's alternating current bus.

3.16.3.2 EMERGENCY POWER:

3.16.3.2.1 DIRECT CURRENT: In the event of failure of the airplane D.C. generator, power shall be supplied for the essential bus only, from the battery.

3.16.3.2.2 ALTERNATING CURRENT: Emergency power, in the event of failure of the main A.C. generator, shall be supplied from a 1-KVA, three-phase, 120/208-volt A.C. generator driven by a hydraulic motor.

3.16.4 (53)(250)(252)(253)(259)(273) EQUIPMENT INSTALLATION: Electrical equipment shall be installed in accordance with Specification MIL-E-7563 and MIL-E-7080 as applicable, except as noted in Appendix II. The battery shall be so installed as to permit ease of replacement and shall be vented as required. Equipment shall be installed to operate in ambient temperatures within the limits of applicable specifications, except that higher temperatures during periods of time not to exceed five minutes will be permissible.

3.16.5 (53)(172) thru (178) (180)(181)(182)(184) thru (197)(251) WIRING: Wiring shall be installed in accordance with Specification No. MIL-W-5088, except as specified in Appendix II.

3.16.6 (53) BONDING: The airplane and equipment shall be bonded as required by Specification No. MIL-B-5087. Shielding shall conform to Specification No. MIL-W-5088.

3.16.7
(128)(254)
(255)(269)

CONTROLS: Switches, circuit breakers, rheostats and resistors shall be provided as required and shall be in accordance with applicable specifications, or as otherwise approved by the WADC.

3.16.7.1
(272)

POWER CONTROL: The electrical power control shall consist of a battery switch, a D.C. generator control switch an A.C. generator control switch, and an emergency electrical power cut-off switch. Failure of either generator shall be indicated by one of two warning lights which are on the "Master Warning Light" system panel, as outlined in paragraph 3.16.11.3. Disconnection of nonessential buses in event of generator failure shall be automatic. Both generator control switches shall provide positions for "ON, "OFF, and "RESET." The emergency cut-off switch shall disconnect all power generation equipment (both A.C. and D.C.) and the battery from the buses.

3.16.8 LIGHTING:
(53)

3.16.8.1 GENERAL: Lighting shall be installed in accordance with Specification No. MIL-L-6503 (USAF). All lighting fixtures and accessory equipment shall be in accordance with applicable specifications or as otherwise approved by the WADC.

3.16.8.2
⑬(137) (224a)
(225) thru (230)
(236) (238)
(241)(276)

INTERIOR: Instrument lighting shall be in accordance with Specification MIL-L-6423A, except as noted in Appendix II. Console panels shall be edge-lighted type in accordance with Specification No. MIL-P-7788, except as noted in Appendix II. Thunderstorm lighting, with off-on switch, shall be provided. All interior lighting except the flight instrument primary lighting shall be operated from the A.C. bus. All primary lighting shall be on the essential bus. Secondary and thunderstorm lights shall be on the non-essential bus.
One type C-4A utility light shall be installed accessible to both the student and instructor.

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 49

DATE 22 May 1956

CHANGE (ECP) NO. 1126

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955; Convair Ltr. 6-6291 dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem dtd 31 Jan. 1956. CCN #62 MSN ZN-4806, dated 29 Jan. 1957.

CHANGE

FROM:

3.16.8.3 EXTERIOR: Exterior lighting shall be in accordance with Specification No. MIL-L-6503(USAF) and the applicable portions of Specification No. MIL-L-6730, except as noted in Appendix II. A taxi light shall be provided on nose landing gear door. Landing lights shall be installed on both main landing gear wing fairing doors and shall provide the required illumination. The wing tip, tail and fuselage lights shall be of a special design and shall be subject to approval by WADC. The position lights shall be operated from the essential A.C. bus through transformers.

TO:

3.16.8.3 EXTERIOR: Exterior lighting shall be in accordance with Specification No. MIL-L-6503(USAF) and the applicable portions of Specification No. MIL-L-6730, except as noted in Appendix II. A taxi light shall be provided on nose landing gear door. Landing lights shall be installed on both main landing gear wing fairing doors and shall provide the required illumination. The wing tip, tail and fuselage lights shall be of a special design and shall be subject to approval by WADC. The position lights shall be operated from the essential A.C. bus through transformers.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 49 (Cont) **DATE** 22 May 1956

CHANGE (ECP) NO. 1126 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955; Convair Ltr. 6-6291 dtd. 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem dtd 31 Jan. 1956. CCN #62 MSN ZN-4806, dated 29 Jan. 1957.

CHANGE

ADD:

3.16.8.3 EXTERIOR: Exterior lighting shall be in accordance with Specification No. MIL-L-6503(USAF) and the applicable portions of Specification No. MIL-L-6730, except as noted in Appendix II. A taxi light shall be provided on nose landing gear door. Landing lights shall be installed on both main landing gear wing fairing doors and shall provide the required illumination. The navigation lights shall be of a special design and shall be subject to approval by WADC. The navigation lights shall be operated from the essential a-c bus through transformers.

(Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

Effect on Weight:	+ 3.4 lb
Effect on Balance:	+ 755 in lb
Effect on Performance:	Will be accumulated with that of other changes and reported at a later date.

AIRPLANES AFFECTED:

BY

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FORM 618C

3.16.8.3 (231) thru (234) (243) thru (246) EXTERIOR: Exterior lighting shall be in accordance with Specification No. MIL-L-6503 (USAF) and the applicable portions of Specification MIL-L-6730, except as noted in Appendix II. A taxi light shall be provided on nose landing gear door. Landing lights shall be installed on both main landing gear wing fairing doors and shall provide the required illumination. The wing tip, tail and fuselage lights shall be of a special design and shall be subject to approval by WADC, The position lights shall be operated from the essential A.C. bus through transformers.

3.16.9 (268) IGNITION AND STARTING CONTROL SYSTEM: The ignition and starting control system shall be designed to the requirements of the manufacturer of the specified engine. Controls shall be located for ease of operation by the student only and shall be subject to WADC approval.

3.16.10 RECEPTACLES:

3.16.10.1 (261) EXTERNAL POWER: Both direct and alternating current external power receptacles shall be provided for ground operation. The receptacles shall be located as approved by the Mock-Up Board and shall be accessible from the ground. The receptacles shall energize both the essential and non-essential buses when the respective external power plugs are connected. The D.C. and A.C. power receptacles shall conform to AN2552-3A and AN3114-1B respectively.

3.16.10.2 (179) (183) ELECTRICAL CONNECTORS: Electrical connectors shall conform to Specification No. MIL-C-5015, except as noted in Appendix II, and except that where special connectors are required, they shall be subject to WADC approval.

3.16.10.3 (260) FUEL NOZZLE GROUNDING JACK: A fuel nozzle grounding jack shall be provided adjacent to the fuel tank filler connection and shall be identified in accordance with Drawing No. AND 10439.

3.16.10.4 STATIC GROUND: A static ground shall be provided on the landing gear in accordance with USAF Drawing No. 49B7572.

3.16.11 INDICATORS:

3.16.11.1 ALARMS: Landing gear warning horn not required.

(270)

3.16.11.2 SIGNAL ASSEMBLIES: Three landing gear signal assemblies, Specification No. MIL-I-6839, shall be provided on the student's instrument panel to indicate the position of the landing gear units. A cabin altitude warning is not required.

(18) (122)

3.16.11.3 WARNING LIGHTS: Warning lights for the master warning system, hydraulic system (pressure low), and fire and overheat detector system shall be provided on the student's instrument panel. A fire warning indicator light shall also be provided on the instructor's instrument panel. Adjacent to the canopy latch handle shall be located the canopy "UNLOCKED" warning light. In the translucent handle of the landing gear control levers shall be located the landing gear "UNSAFE" warning light. The "HYDRAULIC PRESSURE" warning light shall flash for indication of failure of one system and burn continuously for indication of failure of both hydraulic systems. A switch shall be provided adjacent to the hydraulic warning light to permit the student to extinguish the flashing light (after one system failure) and re-set the warning system for indication of failure of the other hydraulic system. In addition a sub-panel shall be provided on which all non-critical warnings will be grouped. Each non-critical warning signal shall energize a pair of bulbs placed behind a translucent panel. Illumination of the bulbs shall permit the lettering on the panel to become readable. Adjacent to this panel the "Master Warning Light" re-set switch shall be provided. The master warning system shall operate as follows: when warning occurs, other than the four listed above, both the master warning light and the appropriate lights on the sub-panel shall illuminate. The student may operate the "Master Warning Light" reset switch, thereby extinguishing and resetting the light. (Reset operation need not be accomplished prior to additional failures indicating

(239) (240) (275)

3.16.11.3 WARNING LIGHTS (Cont)

on the sub-panel). The system shall then be ready for the next warning. The individual warning lights on this system shall operate independent of the master warning system. A switch shall be provided to test all the lights on the system. The warnings to be included shall be as approved by the Mock-Up Board. The warning lights on the sub-panel shall be of a design approved by WADC.

3.16.11.4 (256) (274) (275) METERS: An alternating current voltmeter for use by the student shall be provided with a selector switch to check various alternating current voltages.

3.16.12 ELECTRIC DRIVES: Electric motors shall be in general accordance with Specification No. AN-M-40. Specifications shall be prepared for all electro-mechanical actuators used in the airplane. These specifications shall include applicable environmental test, test reports, design operating loads and design static loads. These specifications shall be submitted for WADC review.

3.16.13 (257) RELAYS: Relays shall be in accordance with applicable specifications and drawings, except that where special units are required they shall be subject to WADC approval. Relays shall be hermetically sealed where required due to danger of explosion or for operation at altitude.

3.16.14 BOOSTER COIL: Not applicable.

3.16.15 FILTERS: Filters shall be installed only where necessary to insure compliance with Specification No. MIL-I-6051. The type of filters used shall be as approved by WADC.

3.16.16 LOAD ANALYSIS: Electrical load analysis Specifications MIL-E-7016 and MIL-E-7017 shall form a part of this specification.

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 52
DATE 30 August 1956
CHANGE (ECP) NO. 1190
MODEL TF-102A
REVISED 10 July 1957
CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change - Aerno 81-8082 Receiver & 81-666 Antenna in lieu of Aerno 81-8154 - Installation of. CCN 7N-7592(118) & 7N-7593(119)

CHANGE

3.17.1 EQUIPMENT: "The following radio and radar equipment shall be installed ...."

	Description	Nomenclature	Installation Specification	Performance Specification
FROM:	Marker Beacon Receiver	AN/ARN-12	- - - - -	MIL-M-5345(USAF)
TO:	Marker Beacon Receiver	AN/ARN-12	- - - - -	MIL-M-5345(USAF)
	(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4056)			
	Marker Beacon Receiver	AN/ARN-32	MIL-R-25788	MIL-R-25094
	(Effective on A/C Ser. Nos. AF55-4057 thru 55-4059 & 56-2317 thru 56-2379)			

Effect on Weight:	- 7.5 lbs.
Effect on Balance:	-1860 in. lbs.
Effect on Performance:	Will be accumulated with other changes and reported at a later date.

AIRPLANES AFFECTED:

BY RA Martin

APPROVED BY

FORM 618C

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 52

DATE 7 August 1956

CHANGE (ECP) NO. 1166

MODEL TF-102A

REVISED 16 January 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts 14 May 1956. Ref: ECP 1035R_1. CCN 7N-389(41) & 7N-391(16)

CHANGE

3.17.1 EQUIPMENT: "The following radio and radar equipment ...."

	Description	Nomenclature	Installation Specification	Performance Specification
FROM:	*Ground-Air-IFF	AN/APX-25A	MIL-T-9289	MIL-R-25036
	*Effective on A/C Ser. Nos. 55-4032 and on.			
TO:	Ground-Air-IFF	AN/APX-6A	MIL-R-9298	MIL-R-6335B (USAF)

Effective on A/C Ser. Nos. 55-4032 thru 55-4059, 56-2317 thru 56-2379

Effect on Weight, Balance and Performance: Will be accumulated with that of other changes and reported at a later date.

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 52 DATE 7 January 1956

CHANGE (ECP) NO. 1085 MODEL TF-102A REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Telecon with WSPO on 9-21-55. Installation of AFCS and Data Link. CCN #39, MSN 7N-734, dtd 6 Aug. 1956; CCN #4, MSN 6N-6174, dtd 10 May 1956.

CHANGE

3.17.1 EQUIPMENT: "The following radio and radar equipment shall be installed by the Contractor........"

	Description	Nomenclature	Installation Specification	Performance Specification
ADD:	Automatic Flight Control System (AFCS)	Flight Control System	(See Paragraph 3.17.4.7.1)	
	Data Link	AN/ARR-44	(See Paragraph 3.17.4.7.1)	

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)

Effect on Weight, Balance and Performance: None

AIRPLANES AFFECTED:

BY K.W. Martin

APPROVED BY

FORM 618C

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

FINAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 52 DATE 8 June 1955
CHANGE (ECP) NO. 1035B 1 MODEL TF-102A REVISED 15 October 1956
CONTRACT AF33(600)-29264 & -3[illegible]

AUTHORITY AND REASON FOR CHANGE: AMC requested - AMC Ltr. MCPHFC/JJJ/dmp/180, dtd 7 October 1954, Fiscal Year 1955. Change to GFAE. CCN #26 MSN 6N-4345 dtd 1-30-56. CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

3.17.1		EQUIPMENT: Installed by Contractor
ADD:	*	Ground Air IFF AN/APX-25A MIL-T-9289 MIL-R-25036
CHANGE:		Ground Air IFF AN/APX-6A MIL-R-9298 MIL-R-6335 (USAF)
TO:	¢	Ground Air IFF AN/APX-6A MIL-R-9298 MIL-R-6335 (USAF)

Effect on Weight:	None
Effect on Balance:	None
Effect on Performance:	Negligible (Effect of change on performance will be accumulated with that of other changes at a later date.)

¢ Effective on A/C Ser. Nos. AF54-1351 thru 54-1370.

* Effective on A/C Ser. Nos. AF55-4032 and on.

AIRPLANES AFFECTED:

BY W. A. Young Jr

APPROVED BY

FORM 610C - 2

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 52 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Specification Correction. Customer Request. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034 (2).

PARAGRAPH NO.	CHANGE
3.17	Change last sentence to read as follows: "Provisions shall be in general accordance with Specification No. MIL-I-8700."
3.17.1	Change Interphone Performance Specification to MIL-I-6699 (USAF).

AIRPLANES AFFECTED: All

BY

APPROVED BY

FORM 6188-2

CONFIDENTIAL

CONSOLIDATED VULTEE AIRCRAFT CORPORATION
San Diego, California

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE ORDER NO. 52 DATE 1 Feb 1955

CHANGE NO. 1012 MODEL TF-102A REVISED 15 Feb 1955

CONTRACT AF33(600) 23903

AUTHORITY AND REASON FOR CHANGE. CCP 55-4420 (dated 21 February 1955)

PARAGRAPH NO.	CHANGE
3.17.1	

Change last item: * Fire Control System MG-9(Hughes) (See paragraph 3.17.4.7.1)

To : *Fire Control System MG-3T(Hughes) (See paragraph 3.17.4.7.1)

AIRPLANES AFFECTED: [illegible]

BY

APPROVED BY

FORM 6188-2

CONFIDENTIAL

3.17 (176) (220) ELECTRONICS: Installation and provisions shall be made by the Contractor, to the extent specified in paragraph 3.17.1 for the installation of electronic equipment. Provisions shall be in general accordance with Specification No. MIL-I-8298.

3.17.1 EQUIPMENT: The following radio and radar equipment shall be installed by the Contractor. The equipment shall be bench, pre-flight, and flight tested in accordance with applicable specifications listed herein.

Description	Nomenclature	Installation Specification	Performance Specification
UHF Command	AN/ARC-34	WCLC-52-92	MIL-R-8272(USAF
Interphone	AN/AIC-10	WCES-52-38	MIL-I-6999(USAF)
Marker Beacon Receiver	AN/ARN-12	---	MIL-M-5345(USAF
Glide Slope Receiver	AN/ARN-18	X-7296	MIL-R-7263
VHF Navigation Receiver	AN/ARN-14	X-7289A	MIL-R-6334(USAF
Ground Air IFF	AN/APX-6A	MIL-R-9298	MIL-R-6335(USAF
☆Fire Control System	MG-9(Hughes)	(See paragraph 3.17.4.7.1)	

☆ See Paragraph 3.17.4.7.1 for A/C using this System.

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 53 DATE 7 August 1956

CHANGE (ECP) NO. 1166 MODEL TF-102A REVISED 16 January 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts 14 May 1956. Ref: ECP 1035R$_1$. CCN 7N-389(41) & 7N-391(16)

CHANGE

3.17.1 EQUIPMENT: (Cont)
Complete provisions for the following equipment shall be made:

	Description	Nomenclature	Installation Specification	Performance Specification
FROM:	¢Ground-Air-IFF	AN/APX-25(Manual Control)(Alternate equipment installation of AN/APX-6A)	MIL-T-9289	
	¢Effective on A/C Ser. Nos. 54-1351 thru 54-1370			
TO:	Ground-Air-IFF	AN/APX-25A(Manual Control)(Alternate equipment installation of AN/APX-6A)	MIL-T-25348	
	Effective on A/C Ser. Nos. 54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379			

3.17.1.1 CONTROL PANELS: The following radio and radar control panels shall be installed:

	Nomenclature	Description
DELETE:	*C-1128/APX-25	IFF Coder Group Control

*Effective on A/C Ser. Nos. 55-4032 and on.

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 418C

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 53

DATE 7 January 1956

CHANGE (ECP) NO. 1085

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Telecon with WSPO on 9-21-55. Installation of AFCS and Data Link. CCN #39 MSN 7N-734, dtd 6 Aug. 1956; CCN #4 MSN 6N-6174, dtd 10 May 1956.

CHANGE

3.17.1.1 CONTROL PANELS: The following radio and radar control panels shall be installed.

	Nomenclature	Description
ADD:	Automatic Flight Control System (AFCS)	Control System (See Paragraph 3.17.4.7.1)
	AN/ARR-44	Data Link (See Paragraph 3.17.4.7.1)

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 53 **DATE** 13 February 1957

CHANGE (ECP) NO. 547 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AIC Interphone - Revision of. AMC ltr. MCPHFC/JJJ/dmd, dtd 26 Nov. 1956. CCN #82 MSN 7N-5099, #60 MSN 7N-5100, dtd 25 Jan. 1957.

CHANGE

3.17.1.1 CONTROL PANELS: The following radio and radar control panels shall be installed:

	Nomenclature	Description
FROM:	C-824/AIC-10	Interphone Control Panel (2)
TO:	C-824/AIC-10 (Effective on A/C Ser. Nos. AF54-1351 thru 54-1370 & 55-4032 thru 55-4043)	Interphone Control Panel (2)
ADD:	C-824A/AIC-10A (Effective on A/C Ser. Nos. AF55-4044 thru 55-4059 & 56-2317 thru 56-2379)	Interphone Control Panel (2)

Effect on Weight:	- 4.3 lb.
Effect on Balance:	- 1066 in. lb.
Effect on Performance:	Will be accumulated with that of other changes and reported at a later date.

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 53 **DATE** 8 June 1955

CHANGE (ECP) NO. 1035B$_{1}$ **MODEL** TF-102A **REVISED** 15 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested - AMC ltr. MCPHFC/JJJ/dmp/180 dtd 7 October 1954, Fiscal Year 1955 changes to GFAE. CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

3.17.1		EQUIPMENT: (Cont) COMPLETE PROVISIONS FOR	
CHANGE:		Ground Air IFF AN/APX-25 (Manual Control) (Alternate Equipment Installation of AN/APX-6A)	MIL-T-9289
TO:	¢	Ground Air IFF AN/APX-25 (Manual Control) (Alternate Equipment Installation of AN/APX-6A)	MIL-T-9289
3.17.1.1		CONTROL PANELS: shall be installed	
ADD:	*	C-1128/APX-25 IFF Coder Group Control	

* Effective on A/C Ser. Nos. AF55-4032 and on.

¢ Effective on A/C Ser. Nos. AF54-1351 thru -1370.

AIRPLANES AFFECTED:

BY W. A. Young Jr

APPROVED BY

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SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 53 DATE 1 Feb 1955

CHANGE NO. 1012 MODEL TF-102A REVISED 15 February 1955

CONTRACT AF33(600) 23903

AUTHORITY AND REASON FOR CHANGE: Administrative change to specify provision for MG-10T A/C and Weapons Control System. CCN 5N-4480 (Dated 21 February 1955)

PARAGRAPH NO. CHANGE

3.17.1 EQUIPMENT:

ADD: the following under "Complete provisions for the following equipment shall be made:"

"F.I.S.	AN/APX-26
F.I.S.	AN/APX-27
Aircraft & Weapon Control System	MG-10T (Hughes)

3.17.1.1 CONTROL PANELS:

CHANGE:	"MG-9	Controls (see paragraph 3.17.4.7.1)"
TO:	"MG-3T	Controls (see paragraph 3.17.4.7.1)"

No Effect on weight, balance or performance;

AIRPLANES AFFECTED: NOTED

BY

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3.17.1 EQUIPMENT (Cont)

Complete provisions for the following equipment shall be made:

Description	Nomenclature	Installation Specification	Performance Specification
Ground Air IFF	AN/APX-25A (Manual Control) (Alternate equipment installation of AN/APX-6A)	MIL-T-9289	

The following equipment shall have space and weight provisions:

OMNI - DME	AN/ARN-21	WCES-52-50	---

The following equipment shall have space provisions:

UHF Direction Finder Group	AN/ARA-25	WCES-52-53	---

3.17.1.1 CONTROL PANELS: The following radio and radar control panels shall be installed:

(124) (138)

Nomenclature	Description
C-1057/ARC-34	UHF Command Control Panel
C-996/A	VHF Navigation Control Panel
MG-9	Controls (see paragraph 3.17.4.7.1)
C-1158/APX	IFF Transponder Control
C-824/AIC-10	Interphone Control Panel (2)

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SAN DIEGO, CALIFORNIA

FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 54

DATE 7 August 1956

CHANGE (ECP) NO. 1166

MODEL TF-102A

REVISED 16 August 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts 14 May 1956. Ref: ECP 1035R$_1$. CCN 7N-389(41) & 7N-391(16)

CHANGE

3.17.1.1 CONTROL PANELS: (Cont)

Complete provisions for the following radio control panels shall be made:

	Nomenclature	Description
FROM:	¢C-1128/APX-25	IFF Coder Group Control
	¢Effective on A/C Ser. Nos. 54-1351 thru 54-1370	
TO:	C-1128/APX-25	IFF Coder Group Control
	Effective on A/C Ser. Nos. 54-1351 thru 54-1370. 55-4032 thru 55-4059, 56-2317 thru 56-2379	

AIRPLANES AFFECTED:

BY

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CONFIDENTIAL

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 54

DATE 8 June 1955

CHANGE (ECP) NO. 1035B-1

MODEL TF-102A

REVISED 15 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested - AMC ltr. MCPHFC/JJJ/dmp/180, dtd 7 October 1954, Fiscal Year 1955 changes to GFAE. CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

3.17.1.1 CONTROL PANELS (Cont) COMPLETE PROVISIONS FOR

CHANGE: C-1128/APX-25 IFF Coder Group Control

TO: ¢ C-1128/APX-25 IFF Coder Group Control

¢ Effective on A/C Ser. Nos. AF54-1351 thru -1379.

AIRPLANES AFFECTED:

BY W. A. Young Jr

APPROVED BY

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San Diego, California

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 54 DATE 1 Feb 1955

CHANGE NO. 1012 MODEL TF-102A REVISED 15 Feb 1955

CONTRACT AF33(600) 23903

AUTHORITY AND REASON FOR CHANGE. CCN 5T 4460 (dated 21 January 19 [illegible])

PARAGRAPH NO. CHANGE

3.17.1.1 CONTROL PANELS (Cont):

Under "Complete provisions for the following radio control panels shall be made:"

ADD: "AN/APX-26 (Includes APX-27) F.I.S.
MG-10T (Hughes) Aircraft and Weapons Control System"

AIRPLANES AFFECTED: [illegible]

BY O. E. Priest

APPROVED BY C. A. Mohr

FORM 6188-2

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3.17.1.1 CONTROL PANELS (Cont)

Complete provisions for the following radio control panels shall be made:

Nomenclature	Description
C-1128/APX-25	IFF Coder Group Control

Space and weight provisions for the following radio controls shall be made:

C-866/ARN-21	OMNI-DME Control

3.17.1.2 ANTENNAS: All antennas except the GFAE fire control system radar antenna shall be Contractor furnished and installed in accordance with applicable military specifications, except as noted in Appendix II. Antennas shall be provided for the required systems as listed in paragraph 3.17.1.

3.17.1.3 INTERFERENCE: Radio interference tests shall be conducted and necessary suppression accomplished in accordance with Specification No. MIL-I-6051A.

3.17.1.4 WIRING: Wiring shall be installed in accordance with Specification No. MIL-W-5088 except as otherwise stated herein and in Appendix II. All wiring shall be identified and coded in accordance with applicable USAF wiring diagrams. Wiring diagrams shall be submitted for approval.

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SAN DIEGO, CALIFORNIA

Page 1 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 55
DATE 13 February 1957
CHANGE (ECP) NO. 547
MODEL TF-102A
REVISED 20 May 1957
CONTRACT AF33(600)-29264 & -31174
AUTHORITY AND REASON FOR CHANGE: AIC Interphone - Revision of. AMC ltr. MCPHFC/JJJ/dmd, dtd 26 Nov. 1956. CCN #82 MSN 7N-5099, #60 MSN 7N-5100, dtd 25 Jan. 1957.

CHANGE

FROM:

3.17.2.3 INTERPHONE: The necessary circuits and components of intercommunication set AN/AIC-10 shall be installed to provide for the use by both the student and instructor of microphone M-32/AIC (oxygen mask) and head set H-75/AIC (helmet). The installation shall provide a selective "Hot Mike" interphone system for the student and instructor. A control panel for the student shall be located on the center console. A separate control panel for the instructor shall be located on the right hand side console. Provisions shall be made for ground interphone communications between the cockpit and the nose wheel area. The dynamotor shall be installed in the intermediate electronics compartment.

TO:

3.17.2.3 INTERPHONE: The necessary circuits and components of intercommunication set AN/AIC-10 shall be installed to provide for the use by both the student and instructor of microphone M-32/AIC (oxygen mask) and head set H-75/AIC (helmet). The installation shall provide a selective "Hot Mike" interphone system for the student and instructor. A control panel for the student shall be located on the center console. A separate control panel for the instructor shall be located on the right hand side console. Provisions shall be made for ground interphone communications between the cockpit and the nose wheel area. The dynamotor shall be installed in the intermediate electronics compartment.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370 & 55-4032 thru 55-4043)

AIRPLANES AFFECTED:

BY

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Page 2 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 55 (Cont)

DATE 13 February 1957

CHANGE (ECP) NO. 547

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AIC Interphone - Revision of. AMC ltr. MCPHFC/JJJ/dmd, dtd 26 Nov. 1956. CCN #82 MSN 7N-5099, #60 MSN 7N-5100, dtd 25 Jan. 1957.

CHANGE

ADD:

3.17.2.3 INTERPHONE: The necessary circuits and components of inter-communication set AN/AIC-10A shall be installed to provide for the use by both the student and instructor of microphone M-32/AIC (oxygen mask) and head set H-75/AIC (helmet). The installation shall provide a selective "Hot Mike" interphone system for the student and instructor. A control panel for the student shall be located on the center console. A separate control panel for the instructor shall be located on the right hand side console. Provisions shall be made for ground interphone communications between the cockpit and the nose wheel area.

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059 & 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

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3.17.1.5 COOLING: The Contractor shall provide adequate cooling for radio, radar, and fire control components. Such cooling shall be subject to the approval of the WADC.

3.17.2 COMMUNICATIONS EQUIPMENT:

3.17.2.1 COMMAND SET - AN/ARC-34: One UHF communications unit shall be installed in the intermediate electronics compartment. This equipment is used for aircraft to aircraft or aircraft to ground communications. The control shall be installed on the left hand side console.

3.17.2.1.1 (224) The UHF antenna, part of the fin-type antenna assembly, shall be located on the vertical fin, and shall be designed and installed by the Contractor to meet, as a minimum, the performance requirements of Specification No. MIL-A-6224A (USAF) and the requirements of paragraph 3.17.1.2, except as noted in Appendix II.

3.17.2.2 LIAISON SET: Not applicable.

3.17.2.3 INTERPHONE: The necessary circuits and components of intercommunication set AN/AIC-10 shall be installed to provide for the use by both the student and instructor of microphone M-32/AIC (oxygen mask) and head set H-75/AIC (helmet). The installation shall provide a selective "Hot Mike" interphone system for the student and instructor. A control panel for the student shall be located on the center console. A separate control panel for the instructor shall be located on the right hand console. Provisions shall be made for ground interphone communications between the cockpit and the nose wheel area. The dynamotor shall be installed in the intermediate electronics compartment.

3.17.2.4 MICROPHONE AND HEADSETS: Provisions for microphones and headsets shall be made in accordance with paragraph 3.17.2.3. Four microphone switches, AF Specification No. 32549, shall be installed; one on each throttle control and one on each control stick grip.

3.17.2.5 FILTER EQUIPMENT: Not applicable.

3.17.2.6 RECORDING EQUIPMENT: Not applicable.

2.17.3 NAVIGATION EQUIPMENT:

3.17.3.1 RADIO COMPASS: Not applicable.

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SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 56

DATE 30 August 1956

CHANGE (ECP) NO. 1190

MODEL TF-102A

REVISED 10 July 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change - Aerno 81-8082 Receiver & 81-666 Antenna in lieu of Aerno 81-8154 - Installation of. CCN 7N-7592(118) & 7N-7593(119)

CHANGE

FROM:

3.17.3.2 MARKER BEACON EQUIPMENT - AN/ARN-12: The receiver shall be located in the intermediate electronics compartment. This equipment is used for receiving the 75 megacycle marker transmission. An indicator light, part of the VHF navigation course indicator, is mounted on each instrument panel.

TO:

3.17.3.2 MARKER BEACON EQUIPMENT - AN/ARN-12: The receiver shall be located in the intermediate electronics compartment. This equipment is used for receiving the 75 megacycle marker transmission. An indicator light, part of the VHF navigation course indicator, is mounted on each instrument panel.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4056)

3.17.3.2 MARKER BEACON EQUIPMENT - AN/ARN-32: The receiver shall be located in the intermediate electronics compartment. This equipment is used for receiving the 75 megacycle marker transmission. An indicator light, part of the VHF navigation course indicator, is mounted on each instrument panel.

(Effective on A/C Ser. Nos. AF55-4057 thru 55-4059 & 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY RA Martin

APPROVED BY

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3.17.3.2 MARKER BEACON EQUIPMENT - AN/ARN-12: The receiver shall be located in the intermediate electronics compartment. This equipment is used for receiving the 75 megacycle marker transmission. An indicator light, part of the VHF navigation course indicator, is mounted on each instrument panel.

3.17.3.2.1 The antenna for the marker beacon receiver shall be located in the aft section of the left hand center missile bay door. It shall be installed to meet the performance requirements of Specification No. MIL-A-5999 (USAF) and paragraph 3.17.1.2.

3.17.3.3 INSTRUMENT APPROACH EQUIPMENT:

3.17.3.3.1 GLIDE PATH RECEIVER AN/ARN-18: The receiver shall be installed in the intermediate electronics compartment. Choice of the appropriate glide path and localizer channels shall be afforded from the navigation receiver control unit located on the center console. Deviation indication shall be provided by a VHF navigation course indicator located on each instrument panel.

3.17.3.3.1.1 The glide path antenna shall be installed in the nose of the fuselage enclosed by the radome and shall meet the performance requirements of Specification No. MIL-A-6325 (USAF).

3.17.3.3.2 LOCALIZER RECEIVER: See paragraph 3.17.3.7.

3.17.3.4 ALTIMETER - RADIO: Not applicable.

3.17.3.5 RADIO RANGE RECEIVER: Not applicable.

3.17.3.6 HOMING ADAPTER AN/ARA-25: Space provisions shall be made for components of the ARA-25 Direction Finder Group.

3.17.3.6.1 Space provisions for the direction finder antenna shall be made on the under side of the fuselage forward of the nose landing gear.

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FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 57 DATE 7 August 1956

CHANGE (ECP) NO. 1166 MODEL TF-102A REVISED 16 January 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts 14 May 1956. Ref: ECP 1035R_1. CCN 7N-389(41) & 7N-291(16)

CHANGE

FROM:

*3.17.3.8.1 The L-Band Antenna, installed on the top centerline of the fuselage, shall be used with the AN/APX-25A equipment prior to installation of the AN/ARN-21 equipment.

*Effective on A/C Ser. Nos. 55-4032 and on.

TO:

3.17.3.8.1 The L-Band Antennas, installed on the top and bottom centerlines of the fuselage, shall be used with the AN/APX-6A equipment.

Effective on A/C Ser. Nos. 55-4032 thru 55-4059, 56-2317 thru 56-2379

AIRPLANES AFFECTED:

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 57 DATE 8 June 1955

CHANGE (ECP) NO. 1035B$_1$ MODEL TF-102A REVISED 15 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested - AMC ltr. MCPHFC/JJJ/dmp/180, dtd 7 October 1954, Fiscal Year 1955 change to GFAE. CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

LIMIT Existing Paragraph ¢3.17.3.8.1

*3.17.3.8.1 The L-Band Antenna, installed on the top centerline of the fuselage, shall be used with the AN/APX-25A Equipment prior to installation of the AN/ARN-21 Equipment.

¢ Effective on A/C Ser. Nos. AF54-1351 thru -1370.

* Effective on A/C Ser. Nos. AF55-4032 and on.

AIRPLANES AFFECTED:

BY W. A. Young Jr

APPROVED BY LS Otten

FORM 618C - 2

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3.17.3.7 VHF NAVIGATION RECEIVER - AN/ARN-14: The receiver and power unit shall be installed in the intermediate electronics compartment. The receiver provides navigational facilities in the omni range and localizer frequencies. The control shall be installed in the center console. One course deviation indicator and one radio magnetic course indicator shall be installed on each instrument panel. One radio control indicator shall be installed in the intermediate electronics compartment.

3.17.3.7.1 A compass signal power amplifier shall be installed in the intermediate electronics compartment.

3.17.3.7.2 The VHF Navigation antenna, part of the fin tip antenna assembly, shall be located on the vertical fin and shall meet the performance requirements of Specification No. MIL-A-6300(USAF).

3.17.3.8 OMNI - DME EQUIPMENT - AN/ARN-21: Space and weight provisions shall be made for the omni DME equipment in the intermediate electronics compartment. Space and weight provisions for the control and indicator shall be provided on the center console.

3.17.3.8.1 (242) The L-Band antenna, installed on the top centerline of the fuselage, shall be used with the AN/APX-6A equipment prior to installation of the AN/ARN-21 equipment.

3.17.3.9 ARBITRARY COURSE COMPUTER: Not applicable.

3.17.4 RADAR:

3.17.4.1 SEARCH EQUIPMENT: Not applicable.

3.17.4.2 LORAN EQUIPMENT: Not applicable.

3.17.4.3 AUTOMATIC GROUND POSITION INDICATING EQUIPMENT: Not applicable.

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

Page 1 of 2

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 58 DATE 7 August 1956

CHANGE (ECP) NO. 1166 MODEL TF-102A REVISED 16 January 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts 14 May 1956. Ref: ECP 1035R_1. CCN 7N-389(41) & 7N-391(16)

CHANGE

FROM:

*3.17.4.4.1 IDENTIFICATION SET AN/APX-25A (Ground-to-Air IFF): The receiver transmitter unit shall be installed in the center electronics compartment. The control shall be located on the center console.

*3.17.4.4.1.1 L-BAND ANTENNAS: One antenna located on the top centerline of the fuselage aft of the canopy and one antenna located on the bottom centerline of the fuselage forward of the nose wheel well shall be installed by the Contractor to meet the performance requirements of Specification No. MIL-A-6543(USAF) and Paragraph 3.17.1.2, except as noted in Appendix II. Until the AN/ARN-21 Equipment is installed, AN/APX-25A system shall also utilize the L-Band Antenna located on the top centerline of the airplane. (See Paragraph *3.17.3.8.1)

*3.17.4.4.1.2 Installation of the controls shall be made in the center console. Installation of the keyer shall be made. The L-Band Antennas described in Paragraph *3.17.4.4.1.1 shall be utilized.

* Effective on A/C Ser. Nos. 55-3357 and on.

TO:

3.17.4.4.1 IDENTIFICATION SET - AN/APX-6A (Ground-to-Air IFF): The receiver-transmitter unit shall be installed in the intermediate electronics compartment. The control shall be located on the center console.

3.17.4.4.1.1 L-BAND ANTENNAS: One antenna located on the top centerline of the fuselage aft of the intermediate electronics compartment and one antenna located on the bottom centerline of the fuselage forward of the nose wheel well shall be installed by the Contractor to meet the performance requirements of Specification MIL-A-6543(USAF) and Paragraph 3.17.1.2, except as noted in Appendix II. The AN/APX-6A system shall utilize these L-Band Antennas.

AIRPLANES AFFECTED:

BY

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SAN DIEGO, CALIFORNIA

Page 2 of 2

FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 58 (Cont)

DATE 7 August 1956

CHANGE (ECP) NO. 1166 MODEL TF-102A

REVISED 16 January 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts 14 May 1956. Ref: ECP $1035R_1$. CCN 7N-389(41) & 7N-391(16)

CHANGE

TO: (Cont)

3.17.4.4.1.2 As an alternate installation for AN/APX-6A, complete provisions for AN/APX-25A ground-to-air IFF shall be installed. Complete provisions for the controls shall be made in the center console. Complete provisions for the keyer shall be made. The L-Band antennas described in Paragraph 3.17.4.4.1.1 shall be utilized.

Effective on A/C Ser. Nos. 55-4032 thru 55-4059, 56-2317
56-2379

AIRPLANES AFFECTED:

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 58

DATE 8 June 1955

CHANGE (ECP) NO. 1035B1 MODEL TF-102A

REVISED 15 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested - AMC ltr. MCPHFC/JJJ/dmp/180, dtd 7 October 1954. Fiscal Year 1955 changes to GFAE. CCN #26 MSN 6N-4345 dtd 1-30-56 ~~& CCN #34 MSN 6N-7276 dtd 6-25-56.~~

CHANGE

LIMIT Existing Paragraph ¢3.17.4.4.1, ¢3.17.4.4.1.1 and ¢3.17.4.4.1.2

ADD:

*3.17.4.4.1 IDENTIFICATION SET AN/APX-25A (Ground-to-Air IFF): The receiver transmitter unit shall be installed in the center electronics compartment. The control shall be located on the center console.

*3.17.4.4.1.1 L-BAND ANTENNAS: One antenna located on the top centerline of the fuselage aft of the canopy and one antenna located on the bottom centerline of the fuselage forward of the nose wheel well shall be installed by the Contractor to meet the performance requirements of Specification No. MIL-A-6543 (USAF) and Paragraph 3.17.1.2, except as noted in Appendix II. Until the AN/ARN-21 Equipment is installed, AN/APX-25A system shall also utilize the L-Band Antenna located on the top centerline of the airplane. (See Paragraph *3.17.3.8.1)

*3.17.4.4.1.2 Installation of the controls shall be made in the center console. Installation of the keyer shall be made. The L-Band Antennas described in Paragraph *3.17.4.4.1.1 shall be utilized.

¢ Effective on A/C Ser. Nos. AF54-1351 thru -1370.

* Effective on A/C Ser. Nos. AF55-3357 and on.

AIRPLANES AFFECTED:

BY W. A. Young Jr.

APPROVED BY

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CONFIDENTIAL

CONSOLIDATED VULTEE AIRCRAFT CORPORATION
San Diego, California

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL
INF.

SPEC NO. ZD-8-004A

FILE OPP. PG NO. 58 DATE 1 Feb 1955

CHANGE NO. 1012 MODEL TF-102A REVISED 15 Feb 1955

CONTRACT AF33(600) 23903

AUTHORITY AND REASON FOR CHANGE: CCN 5E 4480 (dated 21 December 1954)

PARAGRAPH CHANGE

3.17.4.4.2

Change: "IDENTIFICATION SET (Air-to Air IFF) - AN/APX-27 (Part of the Fire Control System):"

To : "TRANSPONDER SET (F.I.S.) - AN/APX-27"

AIRPLANES AFFECTED. AF54-1351 & on BY.

APPROVED BY C. A. Mohr

FORM 6188 2

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3.17.4.4 IDENTIFICATION EQUIPMENT:

3.17.4.4.1 IDENTIFICATION SET - AN/APX-6A (Ground-to-Air IFF): The receiver-transmitter unit shall be installed in the intermediate electronics compartment. The control shall be located on the center console.

3.17.4.4.1.1 L-BAND ANTENNAS: One antenna located on the top centerline of the fuselage aft of the canopy and one antenna located on the bottom centerline of the fuselage forward of the nose wheel well shall be installed by the Contractor to meet the performance requirements of Specification No. MIL-A-6543 (USAF) and paragraph 3.17.1.2, except as noted in Appendix II. Until the AN/ARN-21 equipment is installed, AN/APX-6A system shall also utilize the L-Band antenna located on the top centerline of the airplane. (See paragraph 3.17.3.8.1).

3.17.4.4.1.2 As an alternate installation for AN/APX-6A, complete provisions for AN/APX-25 ground-to-air IFF shall be installed. Complete provisions for the controls shall be made in the center console. Complete provisions for the keyer shall be made. The L-Band antennas described in paragraph 3.17.4.4.1.1 shall be utilized.

3.17.4.4.2 IDENTIFICATION SET (Air-to-Air IFF) - AN/APX-27 (Part of the Fire Control System): The transmitter, amplifier, duplexer and coupling component provisions shall be installed in the lower section of the vertical fin. The receiver and synchronizer provisions shall be located in the aft accessory compartment. The control provisions shall be installed on the center console.

3.17.4.4.2.1 The IFF antenna shall be located in the fin tip and shall be an integral part thereof. The antenna shall be designed by Hughes Aircraft Company and shall be fabricated and installed by the Contractor in accordance with the following Hughes Aircraft Company drawings:

A464A-4315, A464A-4315-1, A464A-4315-3, A464A-4315-4 and A464A-4315-7.

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A DIVISION OF GENERAL DYNAMICS CORPORATION
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Page 1 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 59

DATE 7 January 1956

CHANGE (ECP) NO. 1085 **MODEL** TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Telecon with WSPO on 9-21-55. Installation of AFCS and Data Link. CCN #39 MSN 7N-734, dtd 6 Aug. 1956; CCN #4 MSN 6N-6174, dtd 10 May 1956.

CHANGE

DELETE the following:

3.17.4.7.1 Complete provisions for the MG-10T aircraft and weapons control system shall be made in all aircraft. This shall be made in all aircraft. This system consists of the following subsystems.

MG-3T	Fire Control System
AFCS	Control, Automatic Flight - F-102 A/C
AN/ARR-44	Data Link

The MG-3T fire control system shall be installed in aircraft Serial No. AF54-1353 and on. This system consists of the following subsystems.

Basic Radar - Computer - Power Supply - Optical Sight Computing (Deflection Type) - Missile Auxiliaries.

ADD:

3.17.4.7.1 The MG-10T aircraft and weapons control system shall be installed. This system consists of the following subsystems.

MG-3T	Fire Control System Consisting of the following subsystems: Basic Radar - Computer - Power Supply - Optical Sight Computer (Deflection Type) - Missile Auxiliaries
AFCS	Flight Control System
AN/ARR-44	Data Link

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 59 (Cont) **DATE** 7 January 1956

CHANGE (ECP) NO. 1085 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Telecon with WSPO on 9-21-55. Installation of AFCS and Data Link. CCN #39 MSN 7N-734, dtd 6 Aug. 1956; CCN #4 MSN 6N-6174 dtd 10 May 1956.

CHANGE

FROM:

3.17.4.7.5 Provisions for the automatic flight control components of the MG-10T system shall be located in the intermediate electronics compartment. Provisions for the AFCS controls shall be in the center console.

TO:

3.17.4.7.5 Provisions for the automatic flight control components of the MG-10T system shall be located in the intermediate electronics compartment. Provisions for the AFCS controls shall be in the center console.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4043)

3.17.4.7.5 Installation of the automatic flight control components of the MG-10T system shall be located in the intermediate electronics compartment. Installation of the AFCS controls shall be in the student instrument panel skirt.

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

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SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 59 DATE 5 July 1955

CHANGE (ECP) NO. 1061B$_1$ MODEL TF-102A REVISED 15 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: RFA #93 of CTCI Board of 27 May 1955 & Memo Report No. MCPHFC-M-356. CCN #73 MSN 6N-6957, dtd 6-11-56 & CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

3.17.4.7.1 CHANGE THE FOLLOWING:

Optical sight (Deflection Type)

TO:

(Space provisions shall be made for Deflection Type Optical Sight)

Effect on Weight: - 2.4 lbs.
Effect on Balance: - 414 in. lbs.
Effect on Performance: Negligible

Effective on A/C Ser. Nos. AF54-1355 thru 55-4059, 56-2317 thru 56-2379

AIRPLANES AFFECTED:

BY W. A. Young

APPROVED BY R. A. Carlson

FORM 610C - 2

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SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 59 DATE 7-5-55

CHANGE NO. 1061 MODEL TF-102A REVISED 8-5-55

CONTRACT AF33(600)-23903 & -29264

AUTHORITY AND REASON FOR CHANGE: RFA No. 93 of CTCI Board of 27 May 1955 and Memo Report No. MCPHFC-M-356
CCN#32 MSN 6N-310, CCN#2 MSN 6N-311 dtd. 7-18-55

PARAGRAPH NO.	CHANGE
3.17.4.7.1	CHANGE TO READ: "The MG-3T Fire Control System shall be installed in Aircraft Serial No. AF54-1353 and on. This System consists of the following Sub-Systems": Basic Radar - Computer - Power Supply - Missile Auxiliaries. (Space provisions shall be made for Deflection Type Optical Sight.)

EFFECT ON WEIGHT:	-2.4 lbs.
EFFECT ON BALANCE:	-414 in. lbs.
EFFECT ON PERFORMANCE:	Negligible

A/C Serial No. AF54-1351 and On.

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 6188-2

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3.17.4.5 INTERROGATION EQUIPMENT:

3.17.4.5.1 AIR-TO-AIR INTERROGATOR-RESPONSER - AN/APX-26 (Part of the Fire Control System): The equipment provisions shall be installed in the forward electronics compartment (nose section) in conjunction with the radar fire control system. The provisions for the control shall be located in the cockpit as part of each radar antenna control.

3.17.4.6 RADAR BEACON: Not applicable.

3.17.4.7 FIRE CONTROL SYSTEM: MG-9 Hughes Aircraft Company.

3.17.4.7.1 Complete provisions for the MG-9 Fire Control System shall be made in all aircraft. The MG-9 Fire Control System components shall be installed in aircraft Serial No. AF54-1353 and on, except that complete provisions only shall be made in all aircraft for the following sub-systems.

AFCS	Automatic Flight Control System
AN/APX-26	Interrogator-Responser, Air-to-Air IFF (Reference paragraph 3.17.4.5.1).
AN/APX-27	Transponder, Air-to-Air IFF (Reference paragraph 3.17.4.4.2)
- - -	Data Link
AILS Coupler	Automatic Instrument Landing System
Optical Sights	Deflection Type

3.17.4.7.2 In general, the nose section of the aircraft shall consist of a radome to house the radar antenna and an equipment compartment for the radar and computer sub-systems of the MG-9 system.

3.17.4.7.3 Cockpit controls and optical sights shall be arranged as specified in paragraph 3.7.1.3.1. A transfer switch shall be installed on the instructor's instrument panel to permit selective use of the MG-9 antenna hand control by either the student or instructor.

3.17.4.7.4 In general, the missile auxiliaries shall be located adjacent to the missile bays.

3.17.4.7.5 Provisions for the automatic flight control and AILS components of the MG-9 system shall be located in the intermediate electronics compartment. Provisions for the AFCS controls shall be in the center console.

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 60 **DATE** 7 January 1956

CHANGE (ECP) NO. 1085 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600) -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Telecon with WSPO on 9-21-55. Installation of AFCS and Data Link. CCN #39 MSN 7N-734, dtd 6 Aug. 1956; CCN #4 MSN 6N-6174, dtd 10 May 1956.

CHANGE

FROM:

3.17.6.1 GUIDE LINKS AND SYSTEMS: Provisions shall be made for data link equipment as part of the aircraft and weapons control system. The data receiver and converter-duplexer provisions shall be located in the intermediate and electronics compartment. The controls provisions shall be located in the center console.

TO:

3.17.6.1 GUIDE LINKS AND SYSTEMS: Provisions shall be made for data link equipment as part of the aircraft and weapons control system. The data receiver and converter-duplexer provisions shall be located in the intermediate and electronics compartment. The controls provisions shall be located in the center console.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4043)

3.17.6.1 GUIDE LINKS AND SYSTEMS: Installation shall be made of the data link equipment as part of the Aircraft and Weapons Control System. The data receiver and converter-duplexer installation shall be located in the intermediate and electronics compartment. The controls provisions shall be located in the center console.

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

CONSOLIDATED VULTEE AIRCRAFT CORPORATION

San Diego, California

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE CPP PG. NO. 60 DATE 1 Feb 1955

CHANGE NO. 1012 MODEL TF-102A REVISED 15 Feb 1955

CONTRACT AF33(600) 23903

AUTHORITY AND REASON FOR CHANGE: CCN 5T 4480 (Dated 21 February 1955)

PARAGRAPH NO.	CHANGE
3.17.6.1	Change first sentence to: "Provision shall be made for data link equipment as part of the aircraft and weapons control system."

AIRPLANES AFFECTED: AF54-1351 & on

BY

APPROVED BY C. A. Mohr

FORM 6186-2

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3.17.5 **ELECTRONIC COUNTERMEASURE:** Not applicable.

3.17.6 **ELECTRONIC GUIDANCE SYSTEM:**

3.17.6.1 **GUIDE LINKS AND SYSTEMS:** Provisions shall be made for data link equipment as part of the fire control system. The data receiver and converter-duplexer provisions shall be located in the intermediate and electronics compartment. The controls provisions shall be located in the center console.

3.17.6.2 A data link flush UHF antenna shall be installed on the door of the intermediate electronics compartment and shall meet, as a minimum, the performance requirements of Specification No. MIL-A-6224A (USAF) and the requirements of paragraph 3.17.1.2, except as noted in Appendix II.

3.17.7 **STATIC DISCHARGERS:** Not applicable.

3.17.8 **EMERGENCY RESCUE TRANSMITTER:** Not applicable.

3.17.9 **RADOME:** A quickly detachable radome shall be provided in the nose of the fuselage to accommodate the fire control system radar antenna. The radome shall be de-iced as specified in paragraph 3.20.2.1. The radome shall incorporate provisions for supporting a nose instrumentation boom as specified in paragraph 3.14.3.

3.17.10 **GROUND TEST EQUIPMENT OUTLET :** One receptacle, Type AN-3102A-18-9S, shall be installed which will accept multiple test equipment plug arrangements, provided by an available AF type service cord. The receptacle shall be mounted in the nose wheel well.

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3.18 ARMAMENT:

(125)

3.18.1 DESCRIPTION: The armament installation shall consist of the specified aircraft rockets and guided missiles and related equipment.

3.18.2 FIXED GUNS: Not required.

3.18.3 ROCKETS AND MISSILES:

3.18.3.1 DESCRIPTION: The armament installation shall consist of GAR-1 and/or GAR-1B missiles and 2.75 inch rockets stored within the bays in the fuselage. Space provisions shall be provided for GAR-1A as defined by Hughes Drawing 142346, dated 2-3-54. The missile bays shall provide for alternate loading arrangements as specified in Section 3.2.13.1. The rockets and missiles shall be fired automatically by the fire control system. Manual firing of the rockets may be accomplished with the aid of the optical sights.

3.18.3.2 ROCKET LAUNCHER: The rocket launchers shall be an integral part of the missile bay doors which shall close flush with the fuselage contour when the launcher is in the retracted position. Means shall be provided for placing the rockets in firing position and for retracting the launcher to the closed position. A rocket firing electrical interlock shall be provided as a part of the rocket launcher to permit rocket firing only when the launcher is in the extended position. An additional rocket firing arrangement shall consist of six pods carried on the missile displacement gear described in paragraphs 3.18.3.3 and 3.2.13.1.1.

3.18.3.3 MISSILE LAUNCHER: Means shall be provided for carrying six missiles within the fuselage. Actuators shall be provided to extend the missiles prior to launching and for retracting the launcher after launching. The missile bay doors shall be provided with a locking arrangement to lock the doors in the closed position. Means shall be provided to hold the doors open on the ground. With the doors open and gear extended it shall be possible to load the missiles onto the launchers.

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SPECIFICATION CHANGE NOTICE FINAL
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 62 **DATE** 15 June 1955

CHANGE (ECP) NO. 1033 **MODEL** TF-102A **REVISED** 13 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor requested because of danger to personnel when ground checking armament gear. CCN #62 MSN 6N-4657, dtd 1-23-56 & CCN #3 MSN 6N-363, dtd 7-18-55.

CHANGE

FROM:

3.18.3.5.1.1 Manually operated momentary switches shall be provided in the nose wheel well for opening and closing the Armament Doors, and to raise and lower the displacing gear for loading.

TO:

¢3.18.3.5.1.1 Manually operated momentary switches shall be located in the left hand main wheel well for opening and closing the Armament Doors, and to raise and lower the displacing gear for loading.

Effect on Weight, Balance and Performance is negligible.

¢ Effective on A/C Ser. Nos. AF54-1353 thru 56-2397.

AIRPLANES AFFECTED:

BY W. A. Young Jr.

APPROVED BY

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SPECIFICATION CHANGE NOTICE
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SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 62

DATE 5 July 1955

CHANGE (ECP) NO. 1061R1 MODEL TF-102A

REVISED 15 October 1956

CONTRACT AF33(600)-23903 & -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: RFA #93 of CTCI Board of 27 May 1955 & Memo Report No. MCPHFC-M-356. CCN #73 MSN 6N-6957 dtd 6-11-56 & CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

3.18.3.5.4 CHANGE TO READ:

Optical Sight: "Space provisions shall be made for each the student and instructor for a Deflection type Optical Sight."

Effective on A/C Ser. Nos. AF54-1355 thru 55-4059, 56-2317 thru 56-2379

AIRPLANES AFFECTED:

BY W. A. Young Jr

APPROVED BY S. A. Carlson

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SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 62 DATE 7-5-55

CHANGE NO. 1061 MODEL TF-102A REVISED 8-5-55

CONTRACT AF33(600)-23903 & 29264

AUTHORITY AND REASON FOR CHANGE: RFA No. 93 of CTCI Board of 27 May 1955 and Memo Report No. MCPHFC-M-356
CCN#32 MSN 6N-310,CCN#2 MSN 6N-311 dtd. 7-18-55

PARAGRAPH NO.	CHANGE
3.18.3.5.4	CHANGE TO READ: Optical Sight: "Space Provisions shall be made for each the student and instructor for a Deflextion Type Optical Sight".

A/C Serial No. AF54-1351 and On.

AIRPLANES AFFECTED:

BY A. F. Daniels

APPROVED BY C. A. Irohn

FORM 6188.8

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3.18.3.4 ALIGNMENT: The missiles shall be so aligned that, in the firing position, their axes will be fixed approximately three degrees down at the front with respect to the chord plane. The rockets shall be aligned approximately two degrees down to the chord plane in the firing position.

3.18.3.5 ARMAMENT CONTROLS:

3.18.3.5.1 The complete firing system shall be a part of the Fire Control System, except for the armament control panel, rocket and missile firing intervalometer and related circuitry.

3.18.3.5.1.1 Manually-operated momentary switches shall be provided in the nose wheel well for opening and closing the armament doors, and to raise and lower the displacing gear for loading.

3.18.3.5.2 It shall be possible to check the continuity of the rocket and missile firing circuits on the ground before aramament installation, with the aid of ground test equipment.

3.18.3.5.3 An interlock switch shall be provided to prevent inadvertent firing of the missiles or rockets when the landing gear is in the extended position.

3.18.3.5.4 OPTICAL SIGHT: An optical sight (fixed type) for each the student and instructor shall be installed in the cockpit as components of the fire control system.

3.18.3.6 EXTENSION AND RETRACTION TIME: The extension time and the retraction time for the armament doors shall each be approximately 1.0 seconds. The extension time for each launcher, with or without the missile, shall be approximately 0.9 seconds. The retraction time for each launcher, with or without the missile, shall be approximately 0.9 seconds. These times shall not be exceeded at any flight speed to limit speed (V_L) and normal load factor (N_Z) of plus or minus 1g from level flight (i.e., 0 to plus 2g). Positive extension and retraction shall be available at all speeds to V_L with the design or alternate weight configurations for a flight acceleration of ± 2g from level flight (i.e., + 3g and -1g).

3.18.4 **FLEXIBLE GUNS:** Provisions for flexible guns are not required.

3.18.5 **STORES:** Provisions for external armament stores are not required.

3.18.6 **PASSIVE DEFENSE:** Not required.

(126)

3.18.7 **BORE SIGHTING:** Bore sighting provisions shall be provided for the fire control system.

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P.R.I.I [illegible]

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 64 DATE 8-4-55

CHANGE NO. 504 MODEL TF-102A REVISED 20 December 1955

CONTRACT AF33(600)-23903 &-29264

AUTHORITY AND REASON FOR CHANGE: Customer requested-RFA No. 5 of MCPHFC(WCSFG) /TF-1-4-1)RGA/eh. CCN #6N-2897(56)

PARAGRAPH NO. CHANGE

Change: 3.19.2.4

From: A means for maintaining forward vision during rain conditions through the windshield curved panels on both sides of the pilots enclosure shall be provided and shall be capable of operating at speeds corresponding to take-off, approach, and landing.

To: Means shall be provided to maintain forward vision during rain conditions through both panels on either side of the fixed windscreen. Through selative switching it shall be possible to select either the R.H. or L.H. side of the windscreen to be cleared, The system shall be capable of operating at speeds corresponding to take-off, approach and landing.

* = Effective on A/C Ser. Nos. AF54-1351, -1354, 54-1364 thru 54-1370 and 55-4032 thru 55-4059..

AIRPLANES AFFECTED: BY

APPROVED BY

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3.19 FURNISHINGS AND EQUIPMENT:

3.19.1 ACCOMMODATIONS FOR PERSONNEL:

(130)

3.19.1.1 ⑩ (127) Ejection seats conforming to Contractors Specification No. 8-04322, shall be submitted to WADC for approval, and in general accordance with Specification MIL-S-9479, shall be installed for the pilots. The seats shall include provisions for attachment and use of an automatic opening lap type safety belt and a shoulder harness. The seats shall accommodate pilots wearing the emergency rescue equipment specified in paragraph 3.19.6.

3.19.1.2 (278) (279) Two pressure regulating valve assemblies, ejection, Type M-8 for anti-"G" suit, shall be installed in accordance with Specification No. MIL-I-7890, except as noted in Appendix II.

3.19.2 MISCELLANEOUS EQUIPMENT:

(129)

3.19.2.1 (136) (219) (275a) (218) Instrument panels shall be provided forward of the pilots for the flight and engine instruments specified in paragraph 3.14.1. The instrument panels shall be in accordance with Specification No. MIL-I-5997, except for deviations noted in Appendix II.

3.19.2.2 (131) (291) A combination flight report holder, map and data case shall be provided.

3.19.2.3 (161) (288) An airplane check list holder shall be provided. The check list shall conform to Specification No. 40149.

3.19.2.4 (60) A means for maintaining forward vision during rain conditions through the windshield curved panels on both sides of the pilots' enclosure shall be provided and shall be capable of operating at speeds corresponding to take-off, approach and landing.

3.19.2.5 Provisions for food and drinking water are not required.

3.19.2.6 Provisions for pyrotechnics are not required.

3.19.3 FURNISHINGS:

3.19.3.1 ⑤ Thermal and acoustical insulating material shall not be provided.

3.19.4 (59) EMERGENCY EQUIPMENT: A light shall be provided on each of the student's and instructor's instrument panels which indicates fire in the engine accessory compartment and overheat in the engine after burner compartment. This light shall flash for indication of overheat and burn steady for indication of fire. Fixed fire extinguishers are not required. Portable and hand-type extinguishers are not required.

3.19.5 OXYGEN EQUIPMENT: A high-pressure oxygen system shall be provided consisting of the equipment specified in Appendix I, including the necessary tubing, fittings, brackets, etc. The oxygen bottle shall be installed perpendicular to line of flight and shall be located in the cockpit just forward of station 217 bulkhead on the shelf between fuselage longerons. The filler valve shall be located in the same place and shall be accessible from the left hand side when the canopy is open.

3.19.6 EMERGENCY RESCUE EQUIPMENT: The emergency rescue equipment for the pilots shall consist of seat-type survival kits and back-type parachutes having dimensions of 15 x 25 x 5 inches.

3.19.7 (241) SPARE BULBS: Spare light bulb stowage shall be installed in locations readily accessible to the pilots.

3.20 AIR CONDITIONING AND ANTI-ICING EQUIPMENT:

3.20.1 ⑥② thru ⑦⓪ (292) **AIR CONDITIONING:** Air for pressurizing and air conditioning the cockpit is obtained from engine compressor bleed. This air passes through an "expansion turbine" type refrigeration package consisting of a ram air cooled heat exchanger (first stage) and an expansion turbine (second stage).

Control of cabin air pressure is obtained by the use of an automatic cabin pressure regulator located inside the cockpit.

Control of cabin air temperature is obtained through the use of a cabin temperature control device which controls butterfly position of a valve which by-passes bleed air around the refrigeration package.

Control of cabin air by the student is as follows:

A three position switch in the cockpit allows selection of:

(a) Cabin air "PRESSURE"
(b) Cabin air "OFF"
(c) Cabin air "RAM"

On emergencies, the student may shut-off all air to the cockpit and maintain pressurization for a short period, or he may select ram air into the cockpit for ventilation purposes.

3.20.1.1 IN-FLIGHT AIR CONDITIONING:

3.20.1.1.1 (61) (66) **OCCUPIED COMPARTMENTS:** Air for pressurizing, heating, cooling and ventilating the cabin shall be as specified in paragraph 3.20.1. The operating pressure differential shall not exceed 5 psi. An altitude versus pressure schedule is shown on Figure 5, page 69.

3.20.1.1.2 OTHER COMPONENTS:

3.20.1.1.2.1 ROCKET AND MISSILE BAY: Air discharging from intermediate electronics compartment will enter missile bay. Temperature sensitive portions of the missiles will be maintained between 0° and 130° F.

3.20.1.1.2.2 ELECTRONIC EQUIPMENT COMPARTMENTS: Ram cooling air shall be supplied to the electronic equipment compartments as necessary to insure satisfactory operation of the equipment.

3.20.1.1.2.3 MISCELLANEOUS COMPARTMENTS: Cooling air shall be provided by means of ram air or cockpit discharge air for the following compartments: Forward electronics compartment, nose wheel well, intermediate electronics compartment.

3.20.1.2 GROUND AIR CONDITIONING:

㉚ ㉞

3.20.1.2.1 OCCUPIED COMPARTMENTS: On the ground, with the canopy closed, the pilots compartment shall be conditioned by means of air bled from the compressor section when the engine is in operation. During standby (engine not running) conditioned air shall be supplied by an auxiliary source (ground support equipment) through an external flexible duct into the cockpit with the canopy partially open.

3.20.1.2.2 OTHER COMPARTMENTS:

3.20.1.2.2.1 ROCKET AND MISSILE BAYS: Conditioned air to the rocket and missile bay is not provided. Temperature sensitive portions of the missiles will be maintained between 0° and 130°F. by ground support equipment.

3.20.1.2.2.2 ELECTRONIC EQUIPMENT COMPARTMENTS: On the ground the electronic equipment located in the forward and intermediate compartments shall be cooled as necessary to insure satisfactory operation of the equipment using the same air source as specified in paragraph 3.20.1.2.1 when the engine is in operation, or by use of an external air source supplied through a duct fitting located in the nose wheel well, when the engine is not in operation.

3.20.2 ANTI-ICING

3.20.2.1 (162) thru (167) ANTI-ICING OF NONTRANSPARENT AREAS: Space and structural provision shall be installed in the wing, tail and fuselage for "non-evaporative, running-wet" type anti-icing in the wing and fin leading edges. The engine air intake duct lips shall be anti-iced by means of engine bleed air. The specified engine includes built-in anti-icing protection. Engine icing detector system shall be provided. The radome shall be de-iced by freezing point suppressant liquid spray system. This de-icing liquid shall be a special load item. Anti-icing shall be in accordance with Specification No. 40395-C, except as noted in Appendix II.

3.20.2.2 (215) (216) (217) ANTI-ICING, DEFROSTING AND DEFOGGING OF TRANSPARENT AREAS: Those portions of the windshield through which visibility is required for landing and use of the optical sights shall have provisions for anti-icing. Inner surfaces of windshield shall be defrosted and defogged in accordance with Specification No. MIL-T-5842. Defogging and defrosting of the canopy will not be provided, as noted in Appendix II.

3.21 PHOTOGRAPHIC: Not required.

CABIN PRESSURIZATION SCHEDULE

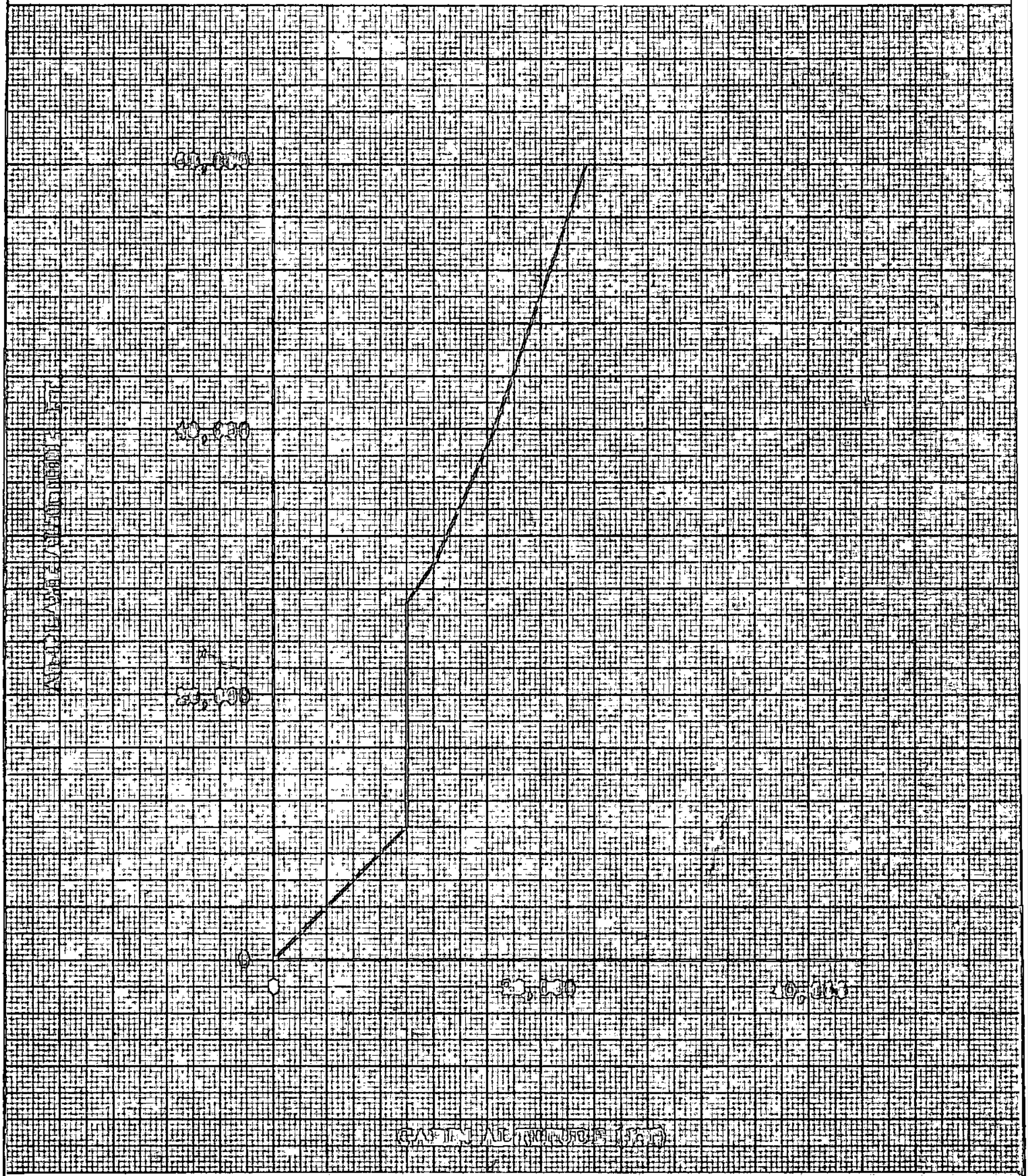

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Figure 5

3.22 AUXILIARY GEAR: Auxiliary gear shall include provisions for towing, jacking, mooring, hoisting and leveling.

3.22.1 TOWING PROVISIONS:

3.22.1.1 MAIN LANDING GEAR: Tow lugs, or equivalent, with an inside diameter of not less than 2 inches shall be provided to permit attachment of a tow bar or cable for towing the airplane forward or backward.

3.22.1.2 NOSE LANDING GEAR: A hollow nose wheel axle with an inside diameter of 3/4 inch shall be provided to permit attachment of a tow bar for towing the airplane forward or pushing backward. An alternate arrangement in which an inside diameter of 3/4 inch extending one inch inboard from each outer face of the axle will be acceptable.

3.22.2 (143) (144) JACKING PROVISIONS: Provision shall be made to jack the airplane as required by the HIAD. The provisions shall be in accordance with Specification No. AN-J-5(2), except as specified in Appendix II. The fuselage jack pad shall be recessed and shall not include mooring provisions.

3.22.3 ㊲ MOORING PROVISIONS: Provision shall be made to moor the airplane in accordance with the requirements of the HIAD, except as specified in Appendix II. The fuselage mooring rings shall be separate from the fuselage jack point.

3.22.4 ㉝ HOISTING PROVISIONS: Provisions shall be made for hoisting the airplane and components in accordance with the requirements of Specification No. MIL-S-5944, except as noted in Appendix II.

3.22.5 ㊳ LEVELING: Leveling provisions consisting of two sets of leveling lugs, and a two jig point arrangement for measuring in accordance with Specification No. MIL-M-6756 shall be provided.

3.22.6 COVERS AND SHIELDS: Covers and/or shields for air scoop and exhaust openings, transparent glass and enclosures, wing, tail, and miscellaneous openings, conforming to Specifications No. MIL-C-5778, MIL-C-5462 and MIL-S-6451, as applicable, shall be furnished as specified in Appendix I-D of this specification.

3.22.7 SPECIAL GROUND SUPPORT EQUIPMENT: Special ground support equipment, when required, shall conform to Specification MIL-D-8512 and MIL-D-8513 and shall be furnished as determined through normal provisioning procedures.

3.22.7.1 The airplane and its components shall be designed to require a minimum quantity of support equipment for normal maintenance replacement of parts, or for servicing.

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4. SAMPLING, INSPECTION AND TEST PROCEDURES:

4.1 (147) The method of inspection and tests shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

5. PREPARATION FOR DELIVERY:

5.1 Preparation for delivery shall be in accordance with Specification No. R-1800-E, dated 18 May 1944, and Amendment No. 5, dated 28 May 1945.

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6. NOTES:

6.1 EXPLANATORY INFORMATION: See applicable data, Appendix III.

6.2 ADDITIONAL INFORMATION: See applicable data, Appendix III.

6.3 DEFINITIONS: Where the phrases "complete provision for" "structural provision for", "space provision for" and "space and weight provisions" are used, the intent is defined as follows:

6.3.1 COMPLETE PROVISIONS FOR: "Complete provisions for" a specific item of equipment, or assembly or installation, shall mean that all supports, brackets, tubes and fittings, electrical wiring, hydraulic lines, etc., are to be installed and adequate weight and space allocated so that the equipment can be installed without alteration to the specified equipment or the airplane, and that no additional parts are required for installation, other than the item itself. Standard stock items such as nuts, bolts, cotter pins, etc., need not be furnished.

6.3.2 STRUCTURAL PROVISIONS FOR: "Structural provisions for" a specific installation shall mean that the primary structure will be structurally adequate for the installation, but that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be provided. Structural provisions also include weight of the equipment involved as an element of alternate weight.

6.3.3. SPACE PROVISIONS FOR: "Space provision for" a specific installation shall mean that space only shall be allocated for the installation, and that brackets, bolt holes, electrical wiring, hydraulic lines, etc., will not be provided. "Space provision for" does not imply that adequate attaching structure is provided, unless otherwise stated in each instance.

6.3.4 SPACE AND WEIGHT PROVISIONS FOR: Same as "Space Provisions For" in paragraph 6.3.3 above, except the weight of the equipment as installed shall be included in "Design Gross Weight."

6.3.5 OTHER DEFINITIONS: Definitions of the HIAD, NACA technical Report No. 474, and Specification No. MIL-I-6252 (USAF) are considered applicable to the airplane described herein.

6.4 Approval by the Procuring Service of a system or component for the F-102A Aircraft shall also constitute approval for the TF-102A Aircraft provided the system and/or components are used in the same application.

6.5 ANTENNAS: Those antennas common with the F-102A Aircraft shall be installed on a TF-102A flight article and only evaluation type flight tests conducted to establish acceptability. Other Antennas shall be tested per applicable specifications.

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 75

DATE 4 April 1957

CHANGE (ECP) NO. $1223R_1$ MODEL TF-102A

REVISED 18 October 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Afterburner Recirculating Igniter Valve - Revision of. Pratt and Whitney ECP 69123C. CCN 8N-1753(150)

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

POWER PLANT (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:	1	1	Engine-Turbo-Jet, including Flap Type Afterburner Nozzle, P & W J57-P-23 (as installed)	35-1608	5058.0
TO:	1	1	Engine-Turbo Jet, including Flap Type Afterburner Nozzle, P & W J57-P-23 (as installed)	35-1608	5058.0
			(Effective on A/C Ser. Nos. 54-1351 thru 56-2331)		
	1	1	Engine-Turbo Jet, including Flap Type Afterburner Nozzle, P & W J57-P-23A (as installed)	35-1637	5058.0
			(Effective on A/C Ser. Nos. 56-2332 thru 56-2379)		

AIRPLANES AFFECTED:

BY W. H. Young Jr.

APPROVED BY P. A. Carlson 4/11

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SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 75

DATE 16 December 1955

CHANGE (ECP) NO. 1099R-1

MODEL TF-102A

REVISED 23 October 1956

CONTRACT AF33(600)-23903

AUTHORITY AND REASON FOR CHANGE: AMC, SAAMA verbal request of 26 October 1955. CCN #68 MSN 6N-5535, dtd 4-2-56.

CHANGE

APPENDIX I - A
GFAE
POWER PLANT (Weight Empty)

Item	Qty	Description	Aerno No.	Total Wt(lbs)
* 1	1	Engine Turbo Jet, Including Flap Type Afterburner Nozzle, P & W J57-P23 (as installed)	35-1608	5058.0
** 1a	1	Engine Turbo Jet, P & W J57-P-41		

Change effectivity of Item 1 - FROM: A/C Ser. Nos. AF54-1351, -1353, -1358 and on.

TO: *A/C Ser. Nos. AF54-1351, -1353 thru -1355, 54-1358 and on.

Change effectivity of Item 1a - FROM: **A/C Ser. Nos. AF54-1352 and -1354 thru -1357.

TO: **A/C Ser. Nos. AF54-1352, -1356 and -1357.

(NOTE: This change installs P-23 engines in lieu of P-41 in A/C Ser. Nos. 54-1354 and -1355.

AIRPLANES AFFECTED:

BY W. A. Young fr

APPROVED BY

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 75 **DATE** 10 November 1955

CHANGE (ECP) NO. 512R$_1$ **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC request to provide combustion starter installation in subject airplanes in lieu of pneumatic type starter. Supp. Agrm. #33, Cont. -23903; Supp. Agrm. #27, Cont. -29264; CCN #31 MSN 7N-2575 dtd 16 Oct. 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

POWER PLANT (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:	2	1	Starter-Pneumatic, Aircraft Engine, Type MB-3, MIL-S-5866A (Pressure regulating and shut-off valve not installed on airplane)........	42-9400	31.3
TO:	2	1	Starter-Pneumatic, Aircraft Engine, Type MB-3, MIL-S-5866A (Pressure regulating and shut-off valve not installed on airplane)........	42-9400	31.3
			(Effective on A/C Ser. Nos. AF54-1351 thru 54-1357)		
	2	1	Starter-Combustion, Aircraft Engine, Type MA-2 Eclipse Pioneer Part No. 37E75-2-A...................	42-8750	51.0
			(Effective on A/C Ser. Nos. AF54-1358 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)		

AIRPLANES AFFECTED:

BY KA Martin

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 75

DATE 10 November 1955

CHANGE (ECP) NO. $512R_1$

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC request to provide combustion starter installation in subject airplanes in lieu of pneumatic type starter. Supp. Agrm. #33, Cont. -23903; Supp. Agrm. #27, Cont. -29264; CCN #31 MSN ZN-2575 dtd 16 Oct. 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

POWER PLANT (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:					
	3a	1	Gear Box, Engine Mounted, Sundstrand #M-634800	48-529	15.0
TO:					
	3a	1	Gear Box, Engine Mounted, Sundstrand #M-634800	48-529	15.0
			(Effective on A/C Ser. Nos. AF54-1351 thru 54-1357)		
	3a	1	Gear Box, Engine Mounted, Sundstrand #M-657140	48-551	15.0
			(Effective on A/C Ser. Nos. AF54-1358 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)		

AIRPLANES AFFECTED:

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SPECIFICATION CHANGE NOTICE
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SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 75
DATE 26 September 1955
CHANGE (ECP) NO. $1002R_1$
MODEL TF-102A
REVISED
CONTRACT AF33(600)-23903
AUTHORITY AND REASON FOR CHANGE: CCN No. 6N-353-(41) dtd 23 August 1955

- -

CHANGE

GFAE - APPENDIX I-A
Power Plant (Weight Empty)

Item	Qty	Description	Aerno No.	Total Wt(lb)
CHANGE:				
1	1	Engine-Turbo-Jet, including Flap Type Afterburner Nozzle, P&W J57-P-23 (As installed)	35-1608	5058.0
To:				
*1	1	Engine-Turbo-Jet, including Flap Type Afterburner Nozzle, P&W J57-P-23 (As installed)	35-1608	5058.0
Add:				
**1a	1	Engine-Turbo-Jet, P&W J57-P-41		

Effect on Weight: Negligible
Effect on Balance: Negligible
Effect on Performance: Negligible

* Effective on A/C Ser. No. AF54-1351, -1353, -1358 & on

** Effective on A/C Ser. No. AF54-1352 & -1354 thru -1357

AIRPLANES AFFECTED: Noted

BY

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

LANDING GEAR (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	1	Wheel Assy - Nose, 24 x 5.5 - Type VII, MIL-W-5013A, S47R459Q	41-1150	20.0
2	2	Wheel Assy - Main Landing, 30 x 8.8 EHP, Type VII, MIL-W-5013A, S52E1235B (Bendix 148050).	41-1675 or 41-1153	88.0
3	2	Brake Assy - Main Landing (for 30 x 8.8 wheel) Type VII, MIL-W-5013A, S52E1235 (B) (Bendix 148320)	41-1156	160.6
4	2	Casing - Main Wheel, 30 x 8.8 EHP, High Speed (18 ply rating), Type VII, MIL-C-5041, S52J1096E.	41-1677	97.9
5	2	Tube - Main Landing, 30 x 8.8 (fabric base), Type VII, MIL-T-5014A, S52J1096	41-1678	15.3
6	1	Casing - 24 x 5.5 Extra High Pressure, High Speed, 12-Ply Rating, Type VII, MIL-C-5041, S48F84 Chg "L".	41-7831	20.6
7	1	Tube - 24 x 5.5 Extra High Pressure, Fabric Base, Type VII, MIL-T-5014B	41-7832	3.7

POWER PLANT (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	1	Engine - Turbo Jet, Including Flap Type After-Burner Nozzle, P & W J57-P-23 (as installed). . .	35-1608	5058.0
2	1	Starter - Pneumatic, Aircraft Engine, Type MB-3, MIL-S-5866A	42-9400	31.3
		(Pressure regulating and shut-off valve not installed on airplane)		
3	1	Constant Speed Accessory Drive Consisting of one each of the following:		
a		Gear Box Engine - Mounted Sundstrand #M-634800.	48-529	16.0
b		Transmission and Gear Box Sundstrand #M-634810.	48-530	90.0

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 76

DATE 11 March 1957

CHANGE (ECP) NO. 1221

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: J-4 Compass Changes - Incorporation of. Air Force request. CCN #96 MSN 7N-5342 & CCN #74 MSN 7N-5343, dated 25 February 1957.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

INSTRUMENTS (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:	4	1	Servo-Amplifier (J-4) (Effective on A/C Ser. Nos. AF55-4044 thru 55-4059 & 56-2317 thru 56-2379)	60-1484	9.0
TO:	4	1	Servo-Amplifier (J-4) (Effective on A/C Ser. Nos. AF55-4044 thru 55-4050)	60-1484	9.0
ADD:	4	1	Servo-Amplifier (J-4) (Effective on A/C Ser. Nos. AF55-4051 thru 55-4059 & 56-2317 thru 56-2379)	60-1488	9.0

AIRPLANES AFFECTED:

BY K A Martin

APPROVED BY

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SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 76

DATE 15 November 1956

CHANGE (ECP) NO. 1209

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Valve CSD Recirculating - Replacement of 660609A with 680018. AMC ltr. MCPHFC(RDZSFG) 5A SSS, dtd 21 Sept. 1956; Sundstrand ECP 17075A. CCN #83 MSN 7N-4782 & CCN #61 MSN 7N-4783, dtd 29 Jan. 1957.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

POWER PLANT (Weight Empty) (Cont)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
ADD:					
	3~~f~~ e	1	Recirculating & Filter Relief By-Pass Valve, Sundstrand #680018	48-568	4.3

(Effective on A/C Ser. Nos. AF55-4051 thru 55-4059 & 56-2317 thru 56-2379)

Effect on Weight, Balance and Performance is negligible.

AIRPLANES AFFECTED:

BY K.A. Martin

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SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 76

DATE 6 November 1956

CHANGE (ECP) NO. 1196

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264

AUTHORITY AND REASON FOR CHANGE: Recirculating Valve - Installation of. CCN #255, MSN 7N-4781; CCN #83 MSN 7N-4782, dtd 29 Jan. 1957.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

POWER PLANT (Weight Empty) (Cont)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
ADD:	3e	1	Recirculating & Filter Relief By-Pass Valve, Sundstrand #M-660609A	48-552	4.3

(Effective on A/C Ser. Nos. AF54-1351, 54-1353, 54-1354, 54-1361, 54-1362, 55-4040 thru 55-4050)

Effect on Weight: +4.3 lb.
Effect on Balance: +2049 in. lb.
Effect on Performance: Will be accumulated with that of other changes and reported at a later date.

AIRPLANES AFFECTED:

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SPECIFICATION CHANGE NOTICE
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SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 76

DATE 9 January 1956

CHANGE (ECP) NO. 1091

MODEL TF-102A

REVISED 23 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Dayton MSG #14 dated 4 October 1955. Change from MB-2 altimeter to MA-1 altimeter in all fiscal year 1955 and on aircraft. CCN #34 MSN 6N-7276, CCN #8 MSN 6N-7277, dtd 6-25-56 & CCN #4 MSN 6N-6174, dtd 5-10-56.

CHANGE

APPENDIX I

GFAE - CONTRACTOR INSTALLED

INSTRUMENTS (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lbs)
ADD:	* 1a	2	Altimeter - Pressure	60-605	1.3

Effect on Weight: Negligible
Effect on Balance: Negligible
Effect on Performance: Negligible

* Effective on A/C Ser. Nos. AF55-4032 thru 56-2379.

AIRPLANES AFFECTED:

BY W. H. Young

APPROVED BY

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SPECIFICATION CHANGE NOTICE
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SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 76 **DATE** 13 September 1955

CHANGE (ECP) NO. 1078 **MODEL** TF-102A **REVISED** 19 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC TWX MCPHFC/JJJ/dmp/P-9-2-1, dtd 8-15-55. CCN #59 MSN 6N-3498, dtd 12-5-55 & CCN #26 MSN 6N-4345, dtd 1-30-56.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

INSTRUMENTS (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lbs)
REMOVE:	6	2	Indicator-Airspeed, Mach No. & Maximum Allowable Speed, Pitot Static, Type ME-2, Exhibit WCL-484, MIL-I-8269	60-4938	2.6
ADD:	6	2	Indicator-Airspeed, Mach No. & Maximum Allowable Airspeed, Type ME-4, MIL-I-8269A	60-4939	2.6

Effective on A/C Ser. Nos. AF54-1362 thru 56-2379.

AIRPLANES AFFECTED:

BY W. A. Young Jr

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 76 **DATE** 14 March 1956

CHANGE (ECP) NO. 519 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC ltr. MCPHFC/JJJ/dmp/P-9-2-1, dtd. 8-15-55, Installation of J-4 Compass System. CCN #74 MSN 7N-3773, dtd 31 Dec. 1956; CCN #50 MSN 7N-3774, dtd 28 Dec. 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

INSTRUMENT (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:					
	4	1	Remote Compass - Type J-2 Consisting of:		
		1	Compensator - Transmitter, Slaved Gyro Magnetic Compass 27635	60-1479	1.4
		1	Control - Directional, Electrically-driven Gyro, Type S-3A, MIL-C-6231A, AM#1	60-1480	7.0
		1	Transmitter - Remote Compass (Unstabilized), Type C-2, 27635	60-1483	(Incl. with 60-1479)
		1	Amplifier - Single Channel Integral Slaved, Gyro Magnetic Compass, Type A-2, MIL-A-6859	60-1702	6.6
		1	Amplifier - Two Channel, Integral, Type B-7A, 21074-D	60-1705	5.0
TO:					
	4	1	Remote Compass - Type J-2 Consisting of:		
		1	Compensator - Transmitter, Slaved Gyro Magnetic Compass 27635	60-1479	1.4
		1	Control - Directional, Electrically-driven Gyro, Type S-3A, MIL-C-6231A, AM#1	60-1480	7.0

AIRPLANES AFFECTED:

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 76 (Cont)

DATE 14 March 1956

CHANGE (ECP) NO. 519

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC ltr. MCPHFC/JJJ/dmp/P-9-2-1, dtd 8-15-55, Installation of J-4 Compass System. CCN #74 MSN 7N-3773 dtd 31 Dec. 1956; CCN #50 MSN 7N-3724 dtd 28 Dec. 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

INSTRUMENT (Weight Empty) (Cont)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
TO: (Cont)		1	Transmitter - Remote Compass (Unstabilized), Type C-2, 27635	60-1483	(Incl. with 60-1479)
		1	Amplifier - Single Channel Integral Slaved, Gyro Magnetic Compass, Type A-2, MIL-A-6859	60-1702	6.6
		1	Amplifier - Two-Channel, Integral, Type B-7A, 21074-D	60-1705	5.0

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4043)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
	4	1	Remote Compass - Type J-4 Consisting of:		
		1	Compensator - Transmitter, Slaved Gyro Magnetic Compass 27635	60-1479	1.4
		1	Servo Amplifier (J-4)	60-1484	9.0
		1	Transmitter - Remote Compass (Unstabilized), Type C-2, 27635	60-1483	(Incl. with 60-1479)
		1	Control - Directional (J-4) MIL-C-8412	60-1485	7.5

AIRPLANES AFFECTED:

BY

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SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-S-004A

FILE OPPOSITE PAGE NO. 76 (Cont)

DATE 14 March 1956

CHANGE (ECP) NO. 519

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC ltr. MCPHFC/JJJ/dmp/P-9-2-1, dtd 8-15-55, Installation of a J-4 Remote Compass System. CCN #74 MSN 7N-3773 dtd 31 Dec. 1956; CCN #50 MSN 7N-3724 dtd 28 Dec. 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

INSTRUMENT (Weight Empty) (Cont)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
TO: (Cont)		1	Panel-Control MIL-C-8412	60-1486	2.0

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)

Effect on Weight: +1.0 lb
Effect on Balance: +79 in lb
Effect on Performance: Negligible

AIRPLANES AFFECTED:

BY

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 76 DATE 12 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)28903, -29264, & -31174

AUTHORITY AND REASON FOR CHANGE: To Correct "Type" No. of Aerno 60-1447 as Identified in Aerno Book Issued 20 Dec 1954. CCN #6N-3031(204) CCN #6N-3032(56) CCN #6N-3033(24) CCN #6N-3034(8).

PARAGRAPH NO. CHANGE

APPENDIX I-A

INSTRUMENTS (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
Change:	5	1	Compass, Magnet, 28V, Pilot Stand-by AN5766-4	60-1447	0.8
To:	5	1	Compass, Magnet, 28V, Pilot Stand-by AN5766-T4	60-1447	0.8

AIRPLANES AFFECTED: AF54-1351 and Subsequent

BY

APPROVED BY

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SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

PRELIMINARY

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 76 DATE 9-12-55

CHANGE NO. $1028R_1$ MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264 &-31174

AUTHORITY AND REASON FOR CHANGE: Costomer requested as stated in AMC teletype P231957Z, SD551 dtd 23 March 1955. CCN #6N-1865(193) CCN #6N-1866(48) CCN #6N-430(6).

PARAGRAPH NO.

CHANGE

APPENDIX - I-A
GFAE - CONTRACTOR INSTALLED
POWER PLANT (Weight Empty)(Conti)

Item No.	Qty.	Desription	Aerno No.	Total Wt(Lb)
ADD:				
4	2	Tank Assy. - 230 gal. -Fuel A/C external jettisonable. Dwg. AF 54J22660 (Type 4)	45-9483	

* Effective on A/C Ser. Nos. 54-1351, -1354 and 54-1361 thru 54-1370
55-4032 thru 55-4059.

AIRPLANES AFFECTED:

BY

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		POWER PLANT (Weight Empty) (Cont)		
3	1	Constant Speed Accessory Drive (Cont)		
c		Drive Shaft, Sundstrand #M-634828	48-528	3.0
d		Covered Drive Shaft, Sundstrand #634838	48-527	1.0
e		Negative "G" Valve, Sundstrand #M-636109	48-534	4.0
		INSTRUMENT (Weight Empty)		
1	2	Altimeter - Pressure, Sensitive, Type MB-2	60-606	2.6
2	1	Indicator - Cabin Air Pressure, Pressurized Aircraft, 1-7/8 in. Dial, Type MA-1, MIL-I-5099A (Aer)	60-603	0.4
3	1	Clock - 1-Hour Elapsed Time, 12-Hour Dial, Type A-13A, MIL-C-6499	60-1201	0.4
4	1	Remote Compass - Type J-2, Consisting of		
	1	Compensator - Transmitter, Slaved Gyro Magnetic Compass, 27635	60-1479	1.1
	1	Control - Directional, Electrically-driven Gyro, Type S-3A, MIL-C-6231A, AM #1	60-1480	7.0
	1	Transmitter - Remote Compass (unstabilized), Type C-2, 27635	60-1483	(incl. with 60-1479)
	1	Amplifier - Single Channel, Integral Slaved Gyro Magnetic Compass, Type A-2, MIL-A-6859	60-1702	6.6
	1	Amplifier - Two-Channel, Integral, Type B-7A, 21074-D	60-1705	5.0
5	1	Compass, Magnetic, 28V, Pilot Stand-by AN5766-4	60-1447	0.8
6	2	Indicator - Airspeed, Mach Number and Maximum Allowable Speed, Pitot Static, Type ME-2, Exhibit WCL-484, MIL-I-8269	60-4938	2.6

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 77

DATE 2 September 1956

CHANGE (ECP) NO. 537

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Exhaust Temperature Indicator - Revision of. AMC ltr. MCPHFC(RDZSFG-5)SSS/jem dtd 31 Jan. 1956. CCN #25 MSN 7N-1735 dtd 12 Sept. 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

INSTRUMENTS (Weight Empty) (Cont)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:	17	1	Indicator - Turbine Outlet Temperature, Thermocouple, Single, 0-1000°C, MS28006-1, MIL-I-7076	61-8829	0.6
TO:	17	1	Indicator - Turbine Outlet Temperature, Thermocouple, Single, 0-1000°C, MS-28006-1, MIL-I-7076 (Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059)	61-8829	0.6
	17	1	Indicator - Turbine Outlet Temperature, Thermocouple, Single, 0-1000°C, Type MJ-2, MIL-I-9443B(ASG) (Effective on A/C Ser. Nos. AF56-2317 thru 56-2379)	61-8857	0.6

Weight, Balance and Performance not affected by this change.

AIRPLANES AFFECTED:

BY

APPROVED BY

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 77

DATE 30 August 1956

CHANGE (ECP) NO. 1189

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: AMC requested. AMC wire SD6301 V DY40 dtd 6-27-56. Aerno 61-8731 Generator - Electric Tachometer in lieu of Aerno 61-8710 - Installation of. CCN #24 MSN 7N-1648 dtd 11 Sept. 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
			INSTRUMENTS (Weight Empty) (Cont)		
FROM:					
	16	1	Generator-Electric Tachometer, 2 Pole, Jet Engine, MIL-G-6027, AN5544-3	61-8710	1.9
TO:					
	16	1	Generator-Electric Tachometer, 2 Pole, Jet Engine, MIL-G-6027, AN5544-3	61-8710	1.9
	(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059)				
	16~~a~~	1	Generator-Electric Tachometer, 2 Pole, Jet Engine	61-8731	1.9
	(Effective on A/C Ser. Nos. AF56-2317 thru 56-2379)				

Effect on Weight, Balance and Performance: Will be accumulated with other changes and reported at a later date.

AIRPLANES AFFECTED:

BY R R Martin

APPROVED BY

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SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 77

DATE 4 November 1955

CHANGE (ECP) NO. 1075 MODEL TF-102A

REVISED 19 October 1956

CONTRACT AF33(600)-23903

AUTHORITY AND REASON FOR CHANGE: Contractor requested due to certain specific requirements in flight testing of specific aircraft. CCN #59 MSN 6N-3498, dtd 12-5-55.

CHANGE

APPENDIX I - A

INSTRUMENT (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lbs)
CHANGE:	@ 8	2	Indicator - Attitude J-8, MIL-I-5133B	60-5933	5.6
TO:	@ 8	0	Not applicable		
ADD:	Ø 8a	2	Indicator - Attitude Type MM-2, Remote Control	60-5935	6.0
	Ø 8b	1	Control Box (K-4B)	60-8553	13.0

@ Effective on A/C Ser. Nos. AF54-1353 thru 54-1360.

Ø Effective on A/C Ser. Nos. AF54-1353 thru 54-1360.

AIRPLANES AFFECTED:

BY W. A. Young Jr

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 77

DATE 4 June 1956

CHANGE (ECP) NO. 525

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Accelerometer - Addition of, AMC wire 27/1838Z March 1956 (MCPHFC/RDZSFG/3-38-E). CCN #60 MSN 7N-2574 & CCN #31 MSN 7N-2575 dtd 16 Oct. 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

INSTRUMENTS (Weight Empty) (Cont)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
ADD:	18	1	Accelerometer, Type B-6, MIL-A-5885A, Eclipse-Pioneer	60-206	1.6

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059 & 56-2317 thru 56-2379)

Effect on Weight: + 1.6 lb.
Effect on Balance: +237.0 in. lbs.
Effect on Performance: Will be accumulated with other changes and reported at a later date.

AIRPLANES AFFECTED:

BY

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SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 77 DATE 12 July 1955

CHANGE NO. 1015R$_2$ MODEL TF-102A REVISED 25 August 1955

CONTRACT AF33(600)23903 & 29264

AUTHORITY AND REASON FOR CHANGE: AMC-TWX-MCPHFC/WCSFB-3-3-E 3-4-55 Dayton TWX MSB No. 74 3-4-55, AMC LTR. MCPHFC (WCSFG)-1-2/RGA/jc 4-15-55, RFA No. 84 OF CTCI Board 5-27-55
CCN#35 MSN 6N-494 dtd 25 July 1955, CCN#5 MSN 6N-431 dtd 25 July 1955

APPENDIX I-A
(GFAE)

		Item	Qty	Description	Aerno	Total Wt.(Lb)
				INSTRUMENT (Weight Empty) (Cont)		
CHANGE FROM		8	2	Indicator Attitude Type J-8, MIL-I-5133B	60-5933	5.6
TO:	@	8	2	Indicator Attitude Type J-8, MIL-I-5133B	60-5933	5.6
ADD:	ø	8a	2	Indicator Attitude Type MM-2 Remote Control	60-5935	6.0
	ø	8b	2	Control Box (K-4B)	60-8353	25.0

@ A/C Serial No. 54-1351 thru 54-1360
ø A/C Serial No. 54-1361 thru 54-1370 & 55-4032 thru 55-4059

AIRPLANES AFFECTED. Noted

BY

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SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 77 DATE 23 June 1955

CHANGE NO. 1043 MODEL TF-102A REVISED 20 December 1955

CONTRACT AF33(600) 29264

AUTHORITY AND REASON FOR CHANGE:

Customer request: Equipment is available as GFAE for Aircraft as indicated. Dayton Msg. 77 dtd. 5-5-55. CCN 6N-1936(#16) Dtd.19 Sept. 1955

PARAGRAPH NO. CHANGE

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT-CONTRACTOR INSTALLED

INSTRUMENTS (WEIGHT EMPTY)

ADD: New Item 18 with Limitation as shown

ITEM	QTY.	DESCRIPTION	AERNO NO.	TOTAL WT(LBS.)
*18	3	Indicator-Position, Landing Gear, Individual Indicating, 28Volt, D.C. Type AN-5839-1 MIL-I-6839	60-3170	0.4

ADD: Limitation at bottom of page

* = A/C Ser. No. AF55-4032 & On

AIRPLANES AFFECTED: Noted:

BY

APPROVED BY

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

INSTRUMENTS (Weight Empty)(Cont)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
7	2	Indicator, Turn and Slip, 4-min Turn, 28-volt D.C., Type MD-1A	60-5703	3.8
8	2	Indicator - Attitude, Type J-8, MIL-I-5133B	60-5933	5.6
9	2	Indicator - Rate-of-Climb, Type AN5825-7, MIL-I-7721	60-6901	2.6
10	1	Tube - Pitot Static, 24-volt, AN5816-2, MIL-T-5420A	60-9200	1.0
11	1	Indicator - Tachometer, Electric, O -110% RPM, Single, MS28000-1, MIL-I-5573A	61-222	0.9
12	2	Transmitter-Hydraulic Pressure, Synchro, MS28005-5, 0-4000 psi, 320° Movement, MIL-T-7113	61-1455	2.3
13	1	Indicator - Hydraulic Pressure, Synchro, MS28010-5, Clamp-mounted, 2-in. size, 0-4000 psi, MIL-I-7084	61-1456	0.7
14	1	Transmitter - Rate-of-Flow, (Fuel), Style J-6, MIL-T-6598	61-2446	7.0
15	1	Indicator - Rate-of-Flow, (Fuel), Style A-19, MIL-I-6599	61-2447	0.5
16	1	Generator - Electric Tachometer, 2-Pole, Jet Engine, MIL-G-6027, AN5544-3	61-6710	1.9
17	1	Indicator - Turbine Outlet Temperature, Thermocouple, Single, 0-1000°C, MS28006-1, MIL-I-7076	61-8829	0.6

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 78

DATE 30 August 1956

CHANGE (ECP) NO. 1197

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC ltr. MCPHFC/JJJ/mhe, dtd 20 July 1956. Automatic Lap Belt Initiator - Change of. CCN #51 MSN 7N-1647, dtd 11 Sept. 1956; CCN #24 MSN 7N-1648, dtd 11 Sept. 1956

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

ARMAMENT - ORDNANCE (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:					
	4	2	Initiator - Delay, with Cartridge, Lap Belt Release, Type M-4 (T-13)	93-726	2.0
TO:					
	4	2	Initiator - Delay, with Cartridge, Lap Belt Release, Type M-4 (T-13)	93-726	2.0
			(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4043)		
	4	2	Initiator - Delay, with Cartridge, Lap Belt Release, Type M-12	93-728	2.0
			(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)		

Effect on Weight, Balance and Performance: Will be accumulated with other changes and reported at a later date.

AIRPLANES AFFECTED:

BY R A Martin

APPROVED BY

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SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 78

DATE 8 June 1955

CHANGE (ECP) NO. 1035R1 **MODEL** TF-102A

REVISED 15 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change - AMC ltr. MCPHFC/TTJ/dmp/ 180 Fiscal Year 1955 GFAE changes. CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

APPENDIX I - A

GFAE - ELECTRICAL (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lbs)
CHANGE:	1	1	Battery-Aircraft Storage 24-volt, 24 Amp-Hr, Type AN 3151-2	42-350	56.0
TO:	* 1	1	Battery-Aircraft Storage 24-volt, 24 Amp-Hr, Type AN 3151-2	42-350	56.0

* Effective on A/C Ser. Nos. AF54-1351 thru -1370.

AIRPLANES AFFECTED:

BY W. A. Young Jr

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt (LB)
		ELECTRICAL (Weight Empty)		
1	1	Battery - Aircraft Storage, 24-volt, 24-amp-hr, Type AN3151-2	42-350	56.0
2	1	Generator - A.C., 30 KVA, 120/208-volt, 3-Phase (Convair Spec 8-06371	42-315	75.0
3	1	Panel - Control, A.C., 115/200-volt, (Convair Spec 8-06371)	42-746	9.0
4	1	Regulator - Voltage, A.C., 115/200-volt	42-301	13.0
5	1	Generator - D.C., 200-ampere, 30-volt (Convair Spec 8-06370	42-2028	48.0
6	1	Panel - Control, D.C. (Convair Spec 8-06370)	42-747	9.5
		ARMAMENT - ORDNANCE (Weight Empty)		
1	6	Initiator - With Cartridge, Type M-3	93-316	4.8
2	2	Exactor - Type M-1	93-317	0.1
3	2	Catapult - Aircraft, Personnel, With Cartridge, Type M-3	93-320	49.4
4	2	Initiator - Delay, with Cartridge, Lap Belt Release, Type M-4 (T-13)	93-726	2.0
5	1	Thruster - With Cartridge, Type M-3	93-742	1.0
6	1	Initiator - With Cartridge, Type M-5	93-318	0.8
		ARMAMENT - (Design Useful Load)		
1	6	Launchers - Missile (Part of fire control system).		150.0

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 79

DATE 13 February 1957

CHANGE (ECP) NO. 547

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AIC Interphone - Revision to. AMC ltr. MCPHFC/JJJ/dmd, dtd 26 Nov. 1956. CCN #82 MSN 7N-5099, #60 MSN 7N-5100, dtd 25 Jan. 1957.

CHANGE

APPENDIX I - A
GFAE - CONTRACTOR INSTALLED
ELECTRONICS (Weight Empty)

FROM:

Item No.	Qty	Description	Aerno No.	Total Wt(lb)
		Intercommunication Set AN/AIC-10		
1	2	Interphone Control-C-824/AIC-10, MCREE-867A, 52D12809 and 2C684-824	81-2226	6.6
2	1	Dynamotor-DY-77/AIC-10, MCREE -867A, 52B12813, 3H-1535-77 .	81-2910	4.1
3	1	Relay RE-94/AIC-10	81-8750	1.9

TO:

Item No.	Qty	Description	Aerno No.	Total Wt(lb)
		Intercommunication Set AN/AIC-10		
1	2	Interphone Control-C-824/AIC-10, MCREE-867A, 52D12809 and 2C684-824	81-2226	6.6
2	1	Dynamotor-DY-77/AIC-10, MCREE -867A, 52B12813, 3H-1535-77 .	81-2910	4.1
3	1	Relay RE-94/AIC-10	81-8750	1.9

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370 & 55-4032 thru 55-4043)

ADD:

Item No.	Qty	Description	Aerno No.	Total Wt(lb)
		Intercommunication Set AN/AIC-10A		
1	2	Interphone Control-C-824A/AIC-10	81-2309	6.6
2	1	Relay Assy. RE-94A/AIC-10 ...	81-8765	1.9

(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059 & 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

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FINAL

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 79

DATE 4 October 1955

CHANGE (ECP) NO. 1073

MODEL TF-102A

REVISED 19 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Change from MA-4 Lap Belt to MA-3 & MA-6 Lap Belt. AMC Ltr. MCPHFC/JJJ/dmp/P-9-2-1, dtd 8-15-55. CCN #94 MSN 7N-168, dtd 9-11-56, CCN #52 MSN 7N-1681 & CCN #25 MSN 7N-1235 dtd 9-12-56.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

FURNISHINGS AND EQUIPMENT (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lbs)
FROM:	2	2	Belt-Aircraft Safety, Lap, Automatic Opening, Type MA-4	45-1717	8.0
TO:	¢ 2	2	Belt-Aircraft Safety, Lap, Automatic Opening, Type MA-3	45-1716	8.0
ADD:	¢¢ 2	2	Belt-Aircraft Safety, Lap, Automatic Opening, Type MA-6	45-1722	8.0

Effect on Weight, Balance and Performance is negligible.

¢ Effective on A/C Ser. Nos. AF54-1351 & 54-1354.

¢¢ Effective on A/C Ser. Nos. AF54-1370, 55-4032 thru 56-2379.

AIRPLANES AFFECTED:

BY W. H. Young Jr

APPROVED BY

FORM 618C - 2

CONFIDENTIAL

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

FURNISHINGS AND EQUIPMENT (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	2	Belt - Aircraft Safety, Lap, Automatic Opening, Type MA-4	45-1717	8.0
2	2	Harness - Shoulder, Aircraft Safety, Adjustable, Type MB-3 (54D 19600)	45-2443	2.2

ELECTRONICS (Weight Empty)

UHF Command Set AN/ARC - 34

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	1	Receiver-Transmitter, RT-263/ARC-34	81-8168	47.2
2	1	Control Panel - C-1057/ARC-34	81-2253	2.9

Intercommunication Set AN/AIC-10

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
1	2	Interphone Control - C-824/AIC-10, MCREE-867A, 52D12809 and 2C684-824	81-2226	6.6
2	1	Dynamotor - DY-77/AIC-10, MCREE-867A, 52B12813, 3H-1535-77	81-2910	4.3
3	1	Relay RE-94/AIC-10	81-8750	1.9

CONVAIR
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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 80

DATE 30 August 1956

CHANGE (ECP) NO. 1190

MODEL TF-102A

REVISED 10 July 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change - Aerno 81-8082 Receiver & 81-666 Antenna in lieu of Aerno 81-8154 - Installation of. CCN 7N-7592(118) & 7N-7593(119)

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

ELECTRONICS (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:			Marker Beacon Receiving Set AN/ARN-12		
	1	1	Radio Receiver, R-122A/ ARN-12 or R-122/ARN-12, 7082A, 2C4180-122	81-8154	7.5
TO:			Marker Beacon Receiving Set AN/ARN-12		
	1	1	Radio Receiver, R-122A/ ARN-12 or R-122/ARN-12, 7082A, 2C4180-122	81-8154	7.5

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4056)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
			Marker Beacon Receiving Set AN/ARN-32		
	1	1	Radio Receiver, R-666/ ARN-32	81-8082	3.0

(Effective on A/C Ser. Nos. AF55-4057 thru 55-4059 & 56-2317 thru 56-2379)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
	2	1	Antenna, AT-536/ARN	81-666	1.0

(Effective on A/C Ser. Nos. AF56-2332 thru 56-2379)

AIRPLANES AFFECTED:

BY RA Martin

APPROVED BY

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CONFIDENTIAL

APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		ELECTRONICS (Weight Empty)		
		Marker Beacon Receiving Set AN/ARN-12		
1	1	Radio Receiver, R-122A/ARN-12 or R-122/ARN-12, 7082A, 2C4180-122	81-8164	7.2
		Radio Receiving Set AN/ARN-18		
1	1	Radio Receiver - R-322/ARN-18, MIL-R-6201, 2C4180-322	81-8164	16.0
		Radio Receiving Set AN/ARN-14D		
1	1	Receiver - Radio, R-541/ARN-14D or R-540/ARN-14C, MCREE-329B	81-8162 or 81-8074	29.6
2	1	Dynamotor - DY-84/ARN-14A, MCREE-329B	81-2911	8.7
3	1	Indicator - Radio Control, ID-251/ARN, MIL-R-5821, 2C1565-251	81-3365	2.0
4	1	Control Panel - C-996/A, MIL-C-8174, S60D-2560, S51H-2514	81-2235	2.6
5	1	Indicator - Course, ID-351/ARN or ID-351A/ARN or ID-387/ARN	81-3371 or 81-3386	3.7
6	2	Indicator - Course, ID-250/ARN or ID-250A/ARN	81-3364 or 81-3374	5.0
7	1	Indicator - Course, ID-48/ARN	81-3362	2.0

CONFIDENTIAL

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 81
DATE 7 August 1956
CHANGE (ECP) NO. 1166
MODEL TF-102A
REVISED 16 January 1957
CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts. Ref: ECP 1035R$_1$. CCN 7N-389(41) & 7N-391(16)

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

ELECTRONICS (Weight Empty) (Cont)

FROM:

RADAR IDENTIFICATION SET AN/APX-25A

Item No.	Qty	Description	Aerno No.	Total Wt(lb)
$1	1	Receiver-Transmitter, Radio (RT-279A/APX)	81-8197	44.5
$2	1	Control Transponder Set (C-1158/APX-25)	81-2288	3.5
$3	1	Control Coder Group (C-1128/APX-25)	81-2280	2.0
$4	1	Coder, Transponder Set (KY-95/APX-25)	81-1911	

$ Effective on A/C Ser. Nos. 55-4032 and on.

TO:

Radar Identification Set AN/APX-6A

Item No.	Qty	Description	Aerno No.	Total Wt(lb)
1	1	Receiver Transmitter, Radio, RT-279A/APX, MIL-R-25125	81-8197	44.5

Effective on A/C Ser. Nos. 55-4032 thru 56-2379

Item No.	Qty	Description	Aerno No.	Total Wt(lb)
2	1	Control Transponder Set, C-1158/APX, MIL-C-8327	81-2288	3.5

Effective on A/C Ser. Nos. 55-4032 thru 55-4059, 56-2317 thru 56-2379

DELETE: Radar Identification Set AN/APX-25A

Effective on A/C Ser. Nos. 55-4032 thru 55-4059, 56-2317 thru 56-2379

AIRPLANES AFFECTED:

BY W. R. Young Jr

APPROVED BY

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 81
DATE 7 January 1956
CHANGE (ECP) NO. 1085
MODEL TF-102A
REVISED 20 May 1957
CONTRACT AF33(600) -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Telecon with WSPO on 9-21-55. Installation of AFCS and Data Link. CCN #39 MSN 7N-734, dtd 6 Aug. 1956; CCN #4 MSN 6N-6174, dtd 10 May 1956.

CHANGE

APPENDIX I - A

GFAE - CONTRACTOR INSTALLED

ARMAMENT - GUNNERY (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lb)
CHANGE Weight of Fire Control System:					
FROM:					
	1	1			1196.3
TO:					
	1	1			1196.3
(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4043)					
	1	1			1064.5
(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)					
ADD:					
	3	1	Automatic Flight Control System (AFCS)	52-4374	45.8
	4	1	Data Link AN/ARR-44	52-4373	86.0
(Effective on A/C Ser. Nos. AF55-4044 thru 55-4059, 56-2317 thru 56-2379)					

NOTE: The above change in the MG-3T System weight is a result of removing the AFCS and Data Link from the MG-3T System weight-wise and listing tham as separate items.

AIRPLANES AFFECTED:

BY

APPROVED BY

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 81 **DATE** 8 June 1955

CHANGE (ECP) NO. 1035R1 **MODEL** TF-102A **REVISED** 15 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change AMC ltr. MCPHFC/JJJ/dmp/180 dtd 7 October 1954. Fiscal Year 1955 Change to GFAE Program. CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #31 MSN 6N-2276 dtd 6-25-56.

CHANGE

APPENDIX I - A

(GFAE) - CONTRACTOR INSTALLED

RADAR IDENTIFICATION SET AN/APX-6A

		Item No.	Qty	Description	Aerno No.	Total Wt(lbs)
CHANGE:		1	1	Receiver-Transmitter RT279/APX	81-8195	44.5
		2	1	Control, Transponder Set C-1158/APX MIL-C-8327	81-2288	3.5
TO:	¢	1	1	Receiver-Transmitter RT-279/APX	81-8195	44.5
	¢	2	1	Control, Transponder Set C-1158/APX MIL-C-8327	81-2288	3.5

ADD:

RADAR IDENTIFICATION SET AN/APX-25A

	Item No.	Qty	Description	Aerno No.	Total Wt(lbs)
$	1	1	Receiver-Transmitter, Radio (RT-279A/APX)	81-8197	44.5
$	2	1	Control Transponder Set (C-1158/APC-25)	81-2288	3.5
$	3	1	Control Coder Group (C-1128/APX-25)	81-2280	2.0
$	4	1	Coder, Transponder Set (KY-95/APX-25)	81-3911	

¢ Effective on A/C Ser. Nos. AF54-1351 thru -1370.

$ Effective on A/C Ser. Nos. AF55-4032 and on.

AIRPLANES AFFECTED:

BY W. A. Young Jr

APPROVED BY

FORM 618C - 2

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 81 DATE 1 Feb 1955

CHANGE NO. 1012 MODEL TF-102A REVISED 15 Feb 1955

CONTRACT AF33(600)-23903

AUTHORITY AND REASON FOR CHANGE: CCN 5N-4480 (dated 21 February 1955)

PARAGRAPH NO.	CHANGE
APPENDIX I-A (GFAE)	
	ARMAMENT - GUNNERY (Weight Empty)
Under Item 1 Change	MG-9
To	MG-3T

AIRPLANES AFFECTED:

BY

APPROVED BY

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APPENDIX I-A

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description	Aerno No.	Total Wt(Lb)
		ELECTRONICS (Weight Empty) (Cont)		
		Radar Identification Set AN/APX-6A		
1	1	Receiver-Transmitter - RT-279/APX	81-8195	44.5
2	1	Control Transponder Set - C-1158/APX, MIL-C-8327	81-2288	3.5
		ARMAMENT - GUNNERY (Weight Empty)		
*1	1	Fire control system - Fighter Interceptor, fixed MG-9 (not including nose racks & wiring)	52-4368	1196.3

* See Paragraph 3.17.4.7.1 for A/C Using this System.

CONVAIR
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SAN DIEGO, CALIFORNIA

FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 82

DATE 7 August 1956

CHANGE (ECP) NO. 1166

MODEL TF-102A

REVISED 16 January 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts 14 May 1956. Ref: ECP 1035R_1. CCN 7N-389(41) & 7N-391(16)

CHANGE

APPENDIX I - B

GFAE - GOVERNMENT INSTALLED

ELECTRONICS (Weight Empty)

Item No.	Qty	Description	Aerno No.	Total Wt(lb)
FROM:				
¢1	1	Coder, Transponder Set (KY-95/APX-25)	81-1911	14.3
¢2	1	Control, Coder Group (C-1128/APX-25)	81-2280	2.0

¢ Effective on A/C Ser. Nos. 54-1351 thru 54-1370

Item No.	Qty	Description	Aerno No.	Total Wt(lb)
TO:				
1	1	Coder, Transponder Set KY-95/APX-25	81-1911	14.3
2	1	Control, Coder Group C-1128/APX-25	81-2280	2.0

Effective on A/C Ser. Nos. 54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379

AIRPLANES AFFECTED:

BY

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 82
DATE 7 June 1955
CHANGE (ECP) NO. 1035B$_1$
MODEL TF-102A
REVISED 15 October 1956
CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change - AMC ltr. MCPHFC/JJJ/dmp/180 dtd 7 October 1954. Fiscal Year 1955 changes to GFAE Program. CCN #26 MSN 6N-4345 dtd 1-30-56, CCN #34 MSN 6N-7226 dtd 6-25-56.

CHANGE

APPENDIX I - B

GFAE-GOVERNMENT INSTALLED

ELECTRICAL (Weight Empty)

	Item No.	Qty	Description	Aerno No.	Total Wt(lbs)
CHANGE:	1	1	Coder, Transponder Set (KY-95/APX-25)	81-1911	14.3
	2	1	Control, Coder Group (C-1128/APX-25)	81-2280	2.0
	3	1	Mount MT-1151/APX-25		(Wt. incl. in with item 1 above.)
TO:	¢ 1	1	Coder, Transponder Set (KY-95/APX-25)	81-1911	
	¢ 2	1	Control, Coder Group (C-1128/APX-25)	81-2280	2.0

¢ Effective on A/C Ser. Nos. AF54-1351 thru -1370.

AIRPLANES AFFECTED:

BY W. A. Young

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APPENDIX I-B

GOVERNMENT FURNISHED AIRCRAFT EQUIPMENT - GOVERNMENT INSTALLED

Item No.	Qty	DESCRIPTION	Aerno No.	Total Wt(Lb)
		ARMAMENT (Design Useful Load)		
1	24	Rocket - Aircraft, Folding Fin, 2.75" FFAR		432.0
2	6	Missiles - Air-to-Air, Hughes, GAR-1 and/or GAR-1B		801.0
		ELECTRONICS (Weight Empty)		
1	1	Coder - Transponder Set, KY-95/APX-25	81-1911	14.3
2	1	Control - Coder Group, C-1128/APX-25	81-2280	2.0
3	1	Mount MT-1151/APX-25		(wt. incl. in with item 1 above)
		MISCELLANEOUS (Useful Load)		
1	2	Personnel Parachute - Back-type (size 15x25x5 inches)		40.0
2	2	Survival Kit - Seat-type		36.0
		MISCELLANEOUS (Special Load)		
1	2gal	Anti-icing Fluid - Radome		18.7
		WEIGHT AND SPACE PROVISIONS ONLY (Weight Empty)		
1	1	Omni - DME - AN/ARN-21		57.5

CONVAIR
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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 83

DATE 15 November 1956

CHANGE (ECP) NO. 1203.

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Sundstrand Constant Speed Drive System - Change to. AMC ltr. MCPHFC(RDZSFG/5A)SSS/ewt, dated 13 Aug. 1956. CCN #260, MSN 7N-5032, dtd 4 Feb. 1957; CCN #89 MSN 7N-5033, dtd 4 Feb. 1957; CCN #67 MSN 7N-5034 dtd 4 Feb. 1957.

CHANGE

APPENDIX I - C

CFE - CONTRACTOR INSTALLED

POWER PLANT (Weight Empty)

	Item No.	Qty	Description
ADD:			
	5	1	Accumulator, Sundstrand CSD Oil System (Effective on A/C Ser. Nos. AF54-1351, 54-1353, 54-1354, 54-1361, 54-1362 55-4040 thru 55-4059, 56-2317 thru 56-2379)

Effect on Weight: + 10.5 lb
Effect on Balance: +5291 in lb
Effect on Performance: Will be accumulated with that of other changes and reported at a later date.

AIRPLANES AFFECTED:

BY K.A. Martin

APPROVED BY

FORM 618C

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 83

DATE 10 November 1955

CHANGE (ECP) NO. $512R_1$

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903 & -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC request to provide combustion starter installation in subject airplanes in lieu of pneumatic starter. Supp. Agrm. #33, Cont. -23903; Supp. Agrm. #27, Cont. -29264; CCN #31 MSN 7N-2575 dtd 16 Oct. 1956.

CHANGE

APPENDIX I - C

CFE - CONTRACTOR INSTALLED

PNEUMATIC (High Pressure)

AND

HYDRAULIC SYSTEM (Weight Empty) (Cont)

	Item No.	Qty	Description
FROM:			
	9	2	Flask - Air, 3000 psi
TO:			
	9	2	Flask - Air, 3000 psi

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1357)

	Item No.	Qty	Description
	9	3	Flask - Air 3000 psi

(Effective on A/C Ser. Nos. AF54-1358 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY K. A. Ma

APPROVED BY H D Applegate

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Refer to Contractor's Bill of Materials, Equipment Section, for part numbers.

Item No.	Qty	Description
		LANDING GEAR (Weight Empty)
1	1	Shock Strut - Nose Landing Gear
2	1	Shock Strut - Main Landing Gear
3	1	Steer Damp Unit - Nose Gear
		POWER PLANT (Weight Empty)
1	2	Pump - Fuel Booster, Electric Motor-driven
2	1	Air/Oil Cooler
3	1	Probe - Ice Detector, Cook Electric
4	1	Interpretor - Ice Detector, Cook Electric
		PNEUMATIC (High Pressure) and HYDRAULIC SYSTEM (Weight Empty)
1	2	Pump - Hydraulic, Engine-driven, Variable Volume, Spec MIL-P-7740
2	1	Pump - Hydraulic, Air-driven
3	2	Accumulator - 3000 psi, Hydraulic
4	AR	Valves
5	AR	Cylinders
6	AR	Filters
7	AR	Pressure Switches
8	AR	Quick Disconnects
9	2	Flask - Air, 3000 psi
10	AR	Regulators

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 84 **DATE** 22 May 1956

CHANGE (ECP) NO. 1126 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291 dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem dtd 31 Jan. 1956. CCN #62 MSN 7N-4806 dtd 29 Jan. 1957.

CHANGE

APPENDIX I - C

CFE - CONTRACTOR INSTALLED

ELECTRICAL (Weight Empty)

	Item No.	Qty	Description
DELETE:			
	3	1	Flasher - Position Light
	4	2	Light Assembly - Tail Position, White
	5	2	Light Assembly - Tail position, Yellow
			(Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)
ADD:			
	19	2	Light Assemblies - Rotating Beacon (Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

PHEUMATIC (High Pressure) and HYDRAULIC SYSTEM (Weight Empty) (Cont.)

Item No.	Qty	Description
11	1	Motor - Hydraulic, Alternator Drive
12	2	Reservoirs

ELECTRICAL (Weight Empty)

Item No.	Qty	Description
1	2	Receptacle - External Power, 28-volt, D. C. with Shield
2	1	Receptacle - External Power, 115/200-volt Alternating Current, 3-Phase
3	1	Flasher - Position Light
4	2	Light Assembly - Tail Position, White
5	2	Light Assembly - Tail Position, Yellow
6	4	Light Assembly - Top and Bottom Fuselage
7	1	Taxi Light - 150-Watt, PAR 46
8	2	Light Assembly - Wing Tip (1 red and 1 green)
9	1	Control System - Cabin Temperature
10	1	Control System - NESA
11	2	Light - Landing, PAR 46-250 Watts
12	1	Intervalometer - Rocket Firing (Convair Spec 8-06311)
13	1	Intervalometer - Missile Firing, Convair Spec 8-06363

CONVAIR

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SAN DIEGO, CALIFORNIA

FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 85   DATE 7 August 1956

CHANGE (ECP) NO. 1166   MODEL TF-102A   REVISED 16 January 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: APX-6A in lieu of APX-25A - Installation of. Telecon between AMC & Convair Contracts 14 May 1956. Ref: ECP 1035R_1. CCN 7N-389(41) & 7N-391(16)

CHANGE

APPENDIX I - C

CFE - CONTRACTOR INSTALLED

ELECTRONICS (Weight Empty)

	Item No.	Qty	Description
DELETE:			
	$14	1	Mounting, MT-1151/APX-25

$Effective on A/C Ser. Nos. 55-4032 thru 55-4059, 56-2317 thru 56-2379

AIRPLANES AFFECTED:

BY

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 85

DATE 30 August 1956

CHANGE (ECP) NO. 1190

MODEL TF-102A

REVISED 10 July 1957

CONTRACT AF33(600)-29264, -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change - Aerno 81-8082 Receiver & 81-666 Antenna in lieu of Aerno 81-8154 - Installation of. CCN 7N-7592(118) & 7N-7593(119)

CHANGE

APPENDIX I - C

CFE - CONTRACTOR INSTALLED

ELECTRONICS (Weight Empty)

	Item No.	Qty	Description
DELETE:	2	1	Antenna - Marker Beacon

(Effective on A/C Ser. Nos. AF56-2332 thru 56-2379)

	Item No.	Qty	Description
FROM:	12	1	Mounting - MT-589/ARN-12 or MT-589A/ARN-12
TO:	12	1	Mounting - MT-589/ARN-12 or MT-589A/ARN-12

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4056)

	Item No.	Qty	Description
	12	1	Mount - MT-1546/ARN-32

(Effective on A/C Ser. Nos. AF55-4057 thru 55-4059 & 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY RA Martin

APPROVED BY

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SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 85

DATE 8 June 1955

CHANGE (ECP) NO. 1035R1

MODEL TF-102A

REVISED 15 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change - AMC ltr. MCPHFC/JJJ/dmp/180 dtd 7 October 1954, Fiscal Year 1955 changes GFAE Program. CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

APPENDIX I - C

(CFE) CONTRACTOR INSTALLED

ELECTRONICS (Weight Empty)

CHANGE:

Item 6 Mounting - MT-1060/u

¢ 6 Mounting - MT-1060/u

ADD:

$ 14 Mounting - MT-1151/APX-25

¢ Effective on A/C Ser. Nos. AF54-1351 thru -1370.

$ Effective on A/C Ser. Nos. AF55-4032 and on.

AIRPLANES AFFECTED:

BY W. A. Young Jr.

APPROVED BY

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CONVAIR
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SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 85 DATE 8 June 1955

CHANGE (ECP) NO. 1035B$_1$ MODEL TF-102A REVISED 15 October 1956

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Customer requested change - AMC ltr. MCPHFC/JJJ/dmp/180, dtd 7 October 1954, Fiscal Year 1955 changes GFAE Program. CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #34 MSN 6N-7276 dtd 6-25-56.

CHANGE

APPENDIX I - C

(CFE) - ELECTRICAL (Weight Empty)

	Item No.	Qty	Description
ADD:	$ 18	1	Battery-Aircraft Storage, 24 volts, 24 Amp-Hr, Type AN3151-2

$ Effective on A/C Ser. Nos. AF55-4032 and on.

AIRPLANES AFFECTED:

BY W.A. Young Jr

APPROVED BY

FORM 618C - 2

CONFIDENTIAL

APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description
		ELECTRICAL (Weight Empty) (Cont.)
14	1	Generator and Control - A.C. 1000-VA, 115/200, 3-Phase, Convair Spec 8-06313
15	1	Actuator-Elevator Trim, Convair Spec 8-04303
16	1	Actuator - Aileron Feel and Trim, Convair Spec 8-04303
17	1	Actuator - Rudder Trim - Convair Spec 8-04303
		ELECTRONICS (Weight Empty)
1	1	Radome
2	1	Antenna - Marker Beacon
3	1	Antenna - Glide Path
4	1	Antenna Assembly - Fin - Tip - UHF, Omni Range, Air-to-Air IFF
5	2	Antenna - Ground-to-Air, IFF
6	1	Mounting - MT-1060/U
7	1	Mounting - MT-1099/U
8	1	Mounting - MT-1439 /A
9	1	Mounting - MT-691/ARN-18
10	1	Mounting - MT-1101/ARN-14
11	1	Mounting - MT-962/ARN-14A
12	1	Mounting - MT-589/ARN-12 or MT-589A/ARN-12
13	1	Antenna - Data Link
		FURNISHINGS AND EQUIPMENT (Weight Empty)
1	2	Ejection Seat Assembly
2	2	Ejection Seat Track

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 86 DATE 26 August 1955

CHANGE (ECP) NO. 1042 MODEL TF-102A REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Altimeter Correction Card Holder - Installation of. AMC ltr. MCPHFC(WCSFG/1-6)RGA/eh, dtd 16 May 1955. Suppl. Agrmt. #32 (Cont. -23903); CCN #31 MSN 6N-5787, dtd 10 May 1956 & CCN #7 MSN 6N-6982 dtd 19 June 1956.

CHANGE

APPENDIX I - C

CFE - CONTRACTOR INSTALLED

FURNISHINGS AND EQUIPMENT (Weight Empty)

	Item No.	Qty	Description
ADD:	14	2	Holder, Card. Altimeter Correction

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1354, 55-4032 thru 55-4059 & 56-2317 thru 56-2379)

Effect on Weight, Balance & Performance: Will be accumulated with that of other changes and reported at a later date.

AIRPLANES AFFECTED:

BY

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 86 DATE 1 June 1955

CHANGE NO. 1021 MODEL TF102A REVISED 30 September 1955

CONTRACT AF33(600)-23903 and 29264

AUTHORITY AND REASON FOR CHANGE: CCN 6N-1110(#179), 6N-1111(#37), dtd 9 Aug.55 AMC Ltr. MCPHFC (WCSFG/1-6) RGA/eh dtd. 11 February 1955 Card obsolete, Replacement not available. CCN 6N-1112(#7) dtd 9 Aug. 1955.

PARAGRAPH NO. CHANGE

APPENDIX I-C CFE-CONTRACTOR INSTALLED FURNISHINGS AND EQUIPMENT (WEIGHT EMPTY)

Delete:

*7	1	Holder; Card, Airspeed correction
*8	1	Card: Airspeed Calabration, Type AF-21-E

*AC Serial No. AF 54-1351 and on

Effect on weight, balance & performance is negligible. (Effect on performance will be accumulated with that of other changes and reported at a later date.)

AIRPLANES AFFECTED: NOTED

BY

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SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 86 DATE 6-14-55

CHANGE NO. 1019 MODEL TF-102A REVISED 8-5-55

CONTRACT AF33(600)-23903

AUTHORITY AND REASON FOR CHANGE: AMC requested - MA-4 Lap Belt to be furnished less hose.
CCN#29 ISN 5T-8733 dtd. 6-27-55

PARAGRAPH NO. CHANGE

APPENDIX I-C CFE - CONTRACTOR INSTALLED FURNISHINGS AND EQUIPMENT (WEIGHT EMPTY (Cont)

ADD:

14	1	Hose - MA-4 Lap Belt

A/C Serial No. AF54-1351 thru 54-1370

AIRPLANES AFFECTED:

BY

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description
		FURNISHINGS AND EQUIPMENT (Weight Empty) (Cont)
3	2	Hose - Anti-G Suit
4	2	Hose - Anti-G Suit
5	2	Connector Assembly - Anti-G Suit
6	1	Drogue Parachute
7	1	Holder - Card, Air Speed Correction
8	1	Card - Air Speed Calibration, Type AF21-E
9	2	Valve Assembly - Regulating Ejection Type, Anti-G, Type M-8
10	1	Canopy Air Spring
11	2	Holder - Card, Stand-by Compass & Radio Magnetic Indicator, AN-5800
12	2	Card, Stand-by Compass & Radio Magnetic Indicator, AN-5823-1
*13	2	Grip - Control Stick Head, Yoke Type
		OXYGEN EQUIPMENT (Weight Empty)
1	2	Regulator - Oxygen for 1800 psi System - Type MB-2
2	1	Cylinder Assembly - Oxygen and Self-Opening Valve (AN6025AX646 cylinder and Kidde #800402 valve)
3	2	Tubing - Oxygen Mask to Seat, Quick Disconnect
4	2	Tubing - Oxygen, Seat, Quick Disconnect to Regulator
5	1	Valve - Oxygen Filler, (incl. AN780-3 or AN790-3 Nipple & Cap-On Filler End) AN6012-1A.
		FIRE DETECTION (Weight Empty)
1	2	Panels
2	2	Sets Cables

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*This item Contractor furnished for those A/C not requiring installation of a Fire Control System. See Para 3.17.4.7.1 for A/C not requiring A Fire Control System.

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SPECIFICATION CHANGE NOTICE

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SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 87 **DATE** 23 June 1955

CHANGE NO. 1043 **MODEL** TF-102A **REVISED** 20 December 1955

CONTRACT AF33(600) 23903

AUTHORITY AND REASON FOR CHANGE:
Customer request: Equipment is available as GFAE for Aircraft as Indicated. Dayton Msg. 77 dtd. 5-5-55. CCN 6N-1936(#16) Dtd. 19 Sept. 1955.

PARAGRAPH NO. **CHANGE**

APPENDIX I-C
CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT-CONTRACTOR INSTALLED
INSTRUMENTS (WEIGHT EMPTY)

Change Item 3 by adding limitation as shown:

ITEM NO	QTY.	DESCRIPTION
*3	3	Indicator, Landing Gear Position MIL-I-6830

ADD: Limitations at bottom of Page

* = A/C Ser. No. AF54-1351 thru AF54-1370

AIRPLANES AFFECTED. Noted:

BY

APPROVED BY

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 87 DATE 30 June 1955

CHANGE NO. 1015R2 MODEL TF-102A REVISED 25 August 1955

CONTRACT AF33(600)-23903 &-29264

AUTHORITY AND REASON FOR CHANGE:
AMC-TWX MCPHFC/WCSFB-3-3-E dtd. 3-4-55, Dayton MSG.#74 3-4-55
AMC ltr. MCPHFC(WCSFG)1-2 RGA/jc 4-15-55, RFA#84 CTCI Board 5-27-55
CCN #85 MSN 6N-494 dtd 25 July 1955, CCN#.5 MSN 6N-431 dtd 25 July 1955

APPENDIX I-C (CFE) CONTRACTOR INSTALLED INSTRUMENTS (Weight Empty)

CHANGE:

Item No.	Qty.	Description
From:		
7	1	Indicator - Outside Air Temperature and Pick-Up.
To:		
#7	1	Indicator - Outside Air Temperature and Pick-Up.

#A/C Serial No. AF54-1351 thru 54-1360

AIRPLANES AFFECTED:

BY

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item NO.	Qty	Description
		PNEUMATIC (low Pressure), AIR CONDITIONING and ANTI-ICING SYSTEMS (Weight Empty)
1	1	Heat Exchanger
2	AR	Valves
3	1	Air Turbine - Refrigeration Unit
4	1	Regulator - Cabin Pressure
5	1	Regulator "Q" Intelligence System
6	1	Pressure Regulator and Shut-Off, Anti-Icing
7	1	Safety Valve - Cabin Pressure
		INSTRUMENTS (Weight Empty)
1	1	Fuel Quantity Gage
2	1	Voltmeter - A.C. 0-150-volt
3	3	Indicator - Landing Gear Position, MIL-I-6839
4	1	Angle of Attack Pick-Up
5	1	Total Air Temperature Pick-Up
6	1	Indicator - Pressure Ratio - Turbo Jet
7	1	Indicator - Outside Air Temperature and Pick-Up
8	1	Indicator- Afterburner Position

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CONSOLIDATED VULTEE AIRCRAFT CORPORATION
San Diego, California

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 88 DATE 1 Feb 1955

CHANGE NO. 1012 MODEL TF-102A REVISED 15 Feb 1955

CONTRACT AF33(600) 23903

AUTHORITY AND REASON FOR CHANGE: CCN 5N 4480 (dated 21 February 1955)

PARAGRAPH NO.	CHANGE
APPENDIX- I-C (CFE)	

ARMAMENT - GUNNERY (Weight Empty)

Under Item 1 Change "MG-9"

To "MG-3T

AIRPLANES AFFECTED:

BY

APPROVED BY C A Mohr

FORM 6188-2

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APPENDIX I-C

CONTRACTOR FURNISHED AIRCRAFT EQUIPMENT - CONTRACTOR INSTALLED

Item No.	Qty	Description
		ARMAMENT - GUNNERY (Weight Empty)
*1	1 set	Nose Racks and Wiring for MG-9 Fire Control
2	1	Mounting Base, to mount HAC part Nos. 401003-110, and 401005-100
3	1	Mounting Base, to mount HAC part No. 423014.
4	1	Mounting Base, to mount HAC part Nos. 463191-100, 463591-100 & 423036-110.
5	1	Mounting Base to mount HAC part No. 423033-120
		AUTOMATIC FLIGHT CONTROL SYSTEM (Weight Empty)
1	1	Pitch and Yaw Damping System
2	1	Pitch "G" Limiting System

*A/C Ser. No. AF54-1352 through 54-1358 are reworked by Contractor from CFE MG-3 nose racks and wiring, A/C Ser. No. AF54-1351 and 54-1359 and on are manufactured by Contractor.

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL
31 March 1958

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 89 DATE 4 June 1956

CHANGE (ECP) NO. 1148 MODEL TF-102A REVISED

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Nose landing gear lock assembly - Add to 263 Equipment. CCN 7N-1522(92), 7N-1523(49) & 8N-1236(143).

CHANGE

APPENDIX I - D

SPECIAL EQUIPMENT - CONTRACTOR INSTALLED

	Item No.	Qty	Description
ADD:	18	1	Lock Assembly - Nose Landing Gear

(Effective on A/C Ser. Nos. 54-1351, 54-1353, 54-1354, 54-1355, 54-1370, 55-4032 thru 55-4059 & 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY W. H. Young

APPROVED BY P. P. Collins

FORM 618C

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 89

DATE 21 September 1956

CHANGE (ECP) NO. $1202R_1$

MODEL TF-102A

REVISED 5 April 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Ground Support: Support Assembly, Canopy (263) SAAMA letter SASRPA-6-1066-41 ID/ber dtd. 16 April 1956. CCN 7N-7139(113), 7N-7140 (110)

CHANGE

APPENDIX I - D

SPECIAL EQUIPMENT - CONTRACTOR INSTALLED

	Item No.	Qty	Description
ADD:	20	2	Support Assembly, Canopy (Effective on A/C Ser. Nos. 55-4035 thru 55-4059 and 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY R.C. Martin

APPROVED BY P.A. Carlson

FORM 618C

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 89

DATE 4 June 1956

CHANGE (ECP) NO. 1134

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Addition of Transducer Vane Guard to 263 Equipment. Contractor initiated. CCN #64 MSN 7N-2560, dtd 31 Oct. 1956; CCN #35 MSN 7N-2561, dtd 31 Oct. 1956.

CHANGE

APPENDIX I - D

SPECIAL EQUIPMENT - CONTRACTOR INSTALLED

	Item No.	Qty	Description
ADD:	19	1	Transducer Vane Guard

(Effective on A/C Ser. Nos. AF55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 89

DATE 3 May 1956

CHANGE (ECP) NO. 1135

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264

AUTHORITY AND REASON FOR CHANGE: Contractor requested. Addition of Elevon batten lock assembly to 263 List (Special Equipment). CCN #84 MSN 7N-733; CCN #39 MSN 7N-734, dtd 6 Aug. 1956.

CHANGE

APPENDIX I - D

SPECIAL EQUIPMENT - CONTRACTOR INSTALLED

	Item No.	Qty	Description
ADD:	17	2	Elevon Batten Lock Assembly

(Effective on A/C Ser. Nos. AF54-1351, 54-1353 thru 54-1370, 55-4032 thru 55-4043)

AIRPLANES AFFECTED:

BY R A Martin

APPROVED BY

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APPENDIX I-D

SPECIAL EQUIPMENT - CONTRACTOR FURNISHED

Item No.	Qty	Description
1	2	Shield Assembly - Intake Duct...........................
2	1	Shield Assembly - Exhaust Tailpipe......................
3	4	Lock Assembly - Lower Missile Bay Doors..............
4	1	Cover Assembly - Canopy and Radome ....
5	2	Plug Assembly - Boundary Layer Duct. ....
6	4	Lock Assembly - Upper Missile Bay Doors. ....
7	1	Lock Assembly - Speed Brakes..........................
8	1	Cover Assembly - "Q" Intake............................
9	2	Eyebolt Assembly - Wing Mooring Pad.................
10	1	Lock Pin Assembly - Canopy and Seat..................
11	2	Pin - Down Lock, Main Landing Gear ....
12	1	Pin - Down Lock, Nose Landing Gear ....
13	1	Pin - Alignment, Nose Landing Gear Steering ....
14	2	Support Assembly - Radar Door Hold-Open ....

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1, Handbook of Instruction for Aircraft Designers, Ninth Edition, Including Revisions up to and Including 1 April 1950.
1	3.1.6	Dimensions and General Data:

Requirement: Paragraph 0.17 - Dimensions (maximum of aircraft parts) "For aircraft whose ferry range is less than 3,000 miles, the design shall be such that the aircraft may be readily disassembled and packed for shipment by rail and oceanborne carrier. Since there are limitations in the size of container which can be transported by surface carrier, all components should be designed to fall within those limitations. The importance of providing suitable fastenings, bearing surfaces, etc., for use in shipment of components and spare parts should be recognized in their design. Whenever it is possible, without unduly compromising design, the disassembled parts of the aircraft shall be of suitable dimensions for packaging in containers of minimum excess cubage."

Deviation: Consideration need not be given in the design for disassembly of the airplane for shipment nor for limitation of dimensions expressly for this purpose.

Reason for Change and Remarks: In the interest of weight savings the airplane has not been designed to the packaging requirements.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
2	3.4	Structural Design Criteria

Requirement: Paragraph 3.1 - "The stress analysis criteria shall be as set forth in Specification No. C-1803. This document is classified Confidential".

Deviation: The structural criteria shall be as indicated in Contractor's Report No. ZU-8-027, "Stress Analysis Criteria for the TF-102A Airplane", in lieu of AF Specification C-1803-3 and R-1803-1 through R-1803-10. The Contractor's report shall be subject to approval of WADC.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range and purpose of the aircraft.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
3	3.4	Structural Design Criteria

Requirement: Paragraph 4.102 - "Detailed measures required by the Air Material Command for avoiding flutter together with the data to be submitted, are listed in Specification No. 1817. It will generally be found advantageous to construct the prototype aircraft using a conservative approach to flutter prevention such as complete compliance with the detail requirements of the specification."

Paragraph 4.112 - "The requirements for the prevention of control surface lift reversal are contained in Specification No. 1817."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
3 (Cont)		Paragraph 4.122 - "Requirements for the desired margin of safety against airfoil divergence are contained in Specification No. 1817."
		Paragraph 4.41 - "The structural vibration survey shall be conducted in accordance with the requirements of ANC Bulletin ANC-12."
		Paragraph 5.43 - "Requirements for flutter prevention of such devices as dive brakes, dive pull-out flaps, spoilers, scoops, etc., are given in AAF Specification No. 1818."
		Paragraph 5.441 - "The requirements for the static balance of control surfaces to prevent flutter are given in Specification 1817."
		Paragraph 5.442 - "The requirements for dynamic balance of control surfaces and the calculations involved in determining dynamic balance may be found in Chapter 4, Flutter, Vibration and Noise, and AAF Specification No. 1817."
	Deviation:	The results of aeroelastic theoretical and experimental investigations (as required by Convair Report ZD-8-003) for the F-102A airplane shall be considered applicable to the TF-102A airplane.

Reason for Change and Remarks: The airplane and components, excepting the fuselage forward of station 310, are common between the F-102A and the TF-102A. It should not be necessary to repeat the aeroelastic investigations for this type of change.

* * * *

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1** (Cont)

4 3.4 Structural Design Criteria

Requirement: Paragraph 4.22 -"There are no detail requirements for the prevention of buffeting. However, aircraft shall be free from buffeting over the entire permissible speed range, except that buffeting may be acceptable as a stall warning if it occurs at a speed not exceeding 10 mph above the stalling speed."

Deviation: The airplane shall be free from objectionable buffeting over the entire permissible speed range.

Reason for Change and Remarks: No definite stall point exists.

* * * *

5 3.19.3.1 Insulating Materials

Requirement: Paragraph 4.620 - Installation of Soundproofing - "The installation of soundproofing shall be in accordance with Specification No. MIL-S-6144."

Deviation: Soundproofing shall not be installed.

Reason for Change and Remarks: The deletion of soundproofing is a weight savings feature.

* * * *

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
6	3.5.2.3	Wing Leading Edge
	3.6.4	Fin Leading Edge

Requirement: Paragraph 5.23 - "The installation of ice elimination equipment shall be in accordance with the requirements of Paragraph 11.3, Ice Elimination Systems."

Deviation: Not applicable to wing and tail. Space and structural provisions only for running wet system shall be made for anti-icing the leading edges of the wing and tail.

Reason for Change and Remarks: Convair studies indicate that operational requirements will be satisfactorily met without the use of an anti-icing system. The following Convair reports provide applicable information on those studies: T-1-111 dated 10-1-53, T-1-144 dated 3-1-54, A-8-56 dated 10-17-53 and A-8-61 dated 12-18-53.

* * * *

7	3.4	Structural Design Criteria

Requirement: Paragraph 6.120 - "Rigid structure shall be provided to support the crew members at all ditching stations for the load factors specified in Specification No. R-1803-5."

Deviation: Requirement not applicable.

Reason for Change and Remarks: Not applicable to this type of aircraft.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
7a	3.4	Structural Design Criteria

Requirement: Paragraph 6.124 - "Turn-over structure. This structure is required for primary, basic and advanced training type aircraft. Reference Specification R-1803-5."

Deviation: Requirement not applicable to this airplane.

Reason for Change and Remarks: The additional weight increase resulting from the installation of turn-over structure would be prohibitive. Also, the mass of structure required in the windshield-canopy area would not be conducive to good visibility. Unnecessary complication of the emergency escape system would also result. Approved by Mock-Up Board Inspection of 28-29 Sept. 1954.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
8	3.7.1.3.6	Pilot's Windshield

Requirement: (a) Paragraph 6.21 - "Flat panels in those areas used for vision in taking off, flying, aiming guns, and landing should be placed at an angle of incidence no greater than 65. if Type I, Grade A glass, or plastic of equivalent optical properties, is used."

(b) Paragraph 6.213 - "The design of transparent sighting areas shall be such that the theoretical variation in sight line deviation around the average sight line deviation over the entire area shall not be greater than ±0.5 mil."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
8 (Cont)	3.7.1.3.6	Pilot's Windshield

(c) Paragraph 6.213 - "Scanning area is defined as that portion of a transparent installation used for vision during taxiing, take-off, flying, landing and scanning from aircraft. The theoretical sight line deviation through any portions of the area inside a one-inch border shall not be greater than 1 mil, at the maximum angle of incidence normally used in the aircraft.

Deviation: (a) The true angle of incidence may be 75 .

(b) The sight line deviation may be 6 mil maximum.

(c) This requirement will be determined at a later date.

Reason for Change and Remarks: (a) A flat windshield installed to HIAD requirements results in severe performance penalties. A sloping "V" windshield has been found to offer the best high speed performance.

(b) The sloping "V" windshield of the TF-102A results in high incidence angles with resultant sight line deviations. (At 75 incidence the deviation through glass is approximately 7 times as great as at 0 incidence.) The "V" windshield also requires vision through the margins of the glass for gun sighting. With present glass lamination manufacturing procedures, deviation through the margins of the glass panels is approximately twice that obtained one inch from the edge.

(c) The optics of the canopy transparent panel are unknown as to this date.

* * * *

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

Page 1 of 3

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 97

DATE 14 September 1956

CHANGE (ECP) NO. 515

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Canopy Glass, Stretched Plex - Installation of. CCN #256 MSN 7N-4803, dtd 29 Jan. 1957; CCN #114 MSN 7N-4804, dtd 29 Jan. 1957; CCN #84 MSN 7N-4805, dtd 29 Jan. 1957; CCN #62 MSN 7N-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

	Deviation	Paragraph	AMC Manual 80-1 (Cont)
FROM:	9	3.7.1.3.6	Pilot's Canopy

Requirement: Paragraph 6.22 - "Specification AN-P-45 is to be complied with in the installation of transparent panels."

Deviation: Specification No. AN-P-45 is to be complied with with the following exceptions:
(a) MIL-P-8184 shall be considered an applicable specification (AN-P-45, Paragraph B).
(b) Satisfactory stress levels of the transparent material will be established by static tests (AN-P-45, Paragraph D-3a).

Reason for Change and Remarks: (a) MIL-P-8184 is a later and superior material. (b) AN-P-45 limits fibre stresses to 650 psi above 77° F. It is intended to demonstrate that the canopy is satisfactory by means of an Air Force approved test program rather than maintain the stress level below 650 psi.

TO:	9	3.7.1.3.6	Pilot's Canopy

Requirement: Paragraph 6.22 - "Specification AN-P-45 is to be complied with in the installation of transparent panels."

Deviation: Specification No. AN-P-45 is to be complied with with the following exceptions:
(a) MIL-P-8184 shall be considered an applicable specification (AN-P-45, Paragraph B).
(b) Satisfactory stress levels of the transparent material will be established by static tests (AN-P-45, Paragraph D-3a).

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 97 (Cont) DATE 14 September 1956

CHANGE (ECP) NO. 515 MODEL TF-102A REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Canopy Glass, Stretched Plex-Installation of. CCN #256 MSN 7N-4803, dtd 29 Jan. 1957; CCN #114 MSN 7N-4804, dtd 29 Jan. 1957; CCN #84 MSN 7N-4805, dtd 29 Jan. 1957; CCN #62 MSN 7N-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

TO: (Cont)	Deviation	Paragraph	AMC Manual 80-1 (Cont)
	9 (Cont)	3.7.1.3.6	Pilot's Canopy (Cont)

Reason for Change and Remarks: (a) MIL-P-8184 is a later and superior material. (b) AN-P-45 limits fibre stresses to 650 psi above 77° F. It is intended to demonstrate that the canopy is satisfactory by means of an Air Force approved test program rather than maintain the stress level below 650 psi.

(Effective on A/C Ser. Nos. AF54-1352, 54-1355 thru 54-1360, 54-1363 thru 54-1365)

9 3.7.1.3.6 Pilot's Canopy

Requirement: Paragraph 6.22 - "Specification AN-P-45 is to be complied with in the installation of transparent panels."

Deviation: Specification No. AN-P-45 is to be complied with, with the following exceptions:
(a) Stretched material shall be in accordance with Contractor's Specification to be submitted to WADC for approval.
(b) Satisfactory stress levels of the transparent material will be established by static tests (AN-P-45, Paragraph D-3a or Contractor's material specification.)

AIRPLANES AFFECTED:

BY

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SAN DIEGO, CALIFORNIA

FINAL

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 97 (Cont)

DATE 14 September 1956

CHANGE (ECP) NO. 515

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Canopy Glass, Stretched Plex - Installation of. CCN #256 MSN 7N-4803, dtd 29 Jan. 1957; CCN #114 MSN 7N-4804, dtd 29 Jan. 1957; CCN #84 MSN 7N-4805, dtd 29 Jan. 1957; CCN #62 MSN 7N-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

TO: Cont)

Deviation	Paragraph	AMC Manual 80-1 (Cont)
9 (Cont)	3.7.1.3.6	Pilot's Canopy (Cont)

Reason for Change and Remarks: (a) Contractor has through coordination with glass manufacturers developed a material suitable for its intended use. Contractor's Specification to be submitted to WADC for approval. (b) AN-P-45 limits fibre stresses to 650 psi above 77° F. It is intended to demonstrate that the canopy is satisfactory by means of an Air Force approved test program rather than maintain the stress level below 650 psi.

(Effective on A/C Ser. Nos. AF54-1351, 54-1353, 54-1354, 54-1361, 54-1362, 54-1366 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

9 3.7.1.3.6 Pilot's Canopy

Requirement: Paragraph 6.22 - "Specification AN-P-45 is to be complied with in the installation of transparent panels."

Deviation: Specification No. AN-P-45 is to be complied with, with the following exceptions:

(a) MIL-P-8184 shall be considered an applicable specification (AN-P-45, Paragraph B).

(b) Satisfactory stress levels of the transparent material will be established by static tests (AN-P-45, Paragraph D-3a).

Reason for Change and Remarks: (a) MIL-P-8184 is a later and superior material. (b) AN-P-45 limits fibre stresses to 650 psi above 77° F. It is intended to demonstrate that the canopy is satisfactory by means of an Air Force approved test program rather than maintain the stress level below 650 psi.

* * * *

10 3.19.1.1 Ejection Seat

Requirement: Paragraph 6.411 - "For upward ejection from the airplane, the seats shall be in accordance with Specification No. 25282."

Deviation: Ejection seats conforming to the Contractor's Specification No. 8-04322, as approved by WADC, shall be installed for the pilots.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
10 (Cont)	3.19.1.1	Ejection Seat (Cont)

Reason for Change and Remarks: To provide nonbottoming pilot's ejectable seats with improved arm rest ejection controls and 10° seat angle. Contractor's specification is in general accordance with Specification No. MIL-S-9479.

* * * *

11	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.413 - Standard Cockpits - "In order to insure that all cockpits will be uniform and suitable as possible to pilots, the dimensions and locations of certain items shall be observed. These dimensions and location areas shown on Drawings AD1 through AD3, which will illustrate the requirements for the standard cockpit."

Deviation: Drawing AD1 shall be applicable regarding cockpit dimensions and locations except for:

(a) The seat back angle shall be 10° in lieu of 17°.

(b) The vertical distance from the seat reference point to the reference point of the throttle grip shall be 7.80" in lieu of 13.5".

(c) The horizontal distance from the seat reference point to the reference point of the throttle grip shall be 19.25" in lieu of 19.00".

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont.)
11 (Cont)	3.7.1.3.1	Pilot's Compartment (Cont)

(d) The minimum horizontal distance from center line of seat to inboard edge of throttle grip shall be 12.50" in lieu of 13.00".

(e) The horizontal distance from the seat reference point to the neutral point of the stick grip shall be 20.78" in lieu of 19.00".

(f) The vertical distance from the seat reference point to the neutral point of the stick grip shall be 12.50" in lieu of 13.50".

(g) The seat adjustment shall be parallel to seat back in lieu of 1.5" forward in "up" position and 1.5" aft in "down" position.

(h) The horizontal distance from the seat reference point to the neutral rudder pedal location shall be 36.15" in lieu of 35.25".

(i) The cockpit depth shall be 40.00" in lieu of 39.50".

Reason for Change and Remarks: (a) The 10° seat back angle meets the requirements of specification number MIL-S-9479 dated 3-19-54.

(b) (1) To provide sufficient hand clearance between top of throttle control and cockpit longeron.

(2) Dimension given is with throttle in full military power position rather than "normal cruise", as there is no normal cruise" position for the throttle in a turbo jet powered airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
11 (Cont)	3.7.1.3.1	Pilot's Compartment (Cont)

(c) (1) To provide proper relationship between pilot and throttle with 10° seat.

(2) Dimension given is with throttle in full military power position rather than "normal cruise", as there is no "normal cruise position for the throttle in a turbo jet powered airplane.

(d) To provide sufficient hand clearance between throttle grip and side of cockpit. To maintain same design as F-102A

(e) To provide control stick clearance at seat and abdominal clearance at full aft stick travel.

(f) Control stick shortened two inches from original F-102 configuration as a result of flight evaluation and approved by the F-102A Mock-up Inspection.

(g) The seat adjustment conforms to Specification No. MIL-S-9479.

(h) Rudder pedal adjustment is increased to further compensate for seat adjustment method as required by Specification No. MIL-S-9479.

(i) To provide additional leg clearance beneath the instrument panel as required by F-102A RFA #105 and Item (J) under "Cockpit" of AMC ltr MCPPAF-5/RDF/lmh F-102.01, dated 12-1-52.

(j) To make specification agree with F-102A cockpit mock-up approved 28 July 1954.

✡ ✡ ✡ ✡

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SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 101 (Cont)
DATE 30 April 1957
CHANGE (ECP) NO. 1229
MODEL TF-102A
REVISED
CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Inclosures, Blind Flying - Deletion of. AMC ltr. MCPHFC(RDZSFG/1-2-6B)HHB/ewt, X1-2A, dtd 4 March 1957. CCN 8N-752(131)

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

TO:

Deviation	Paragraph	AMC Manual 80-1 (Cont)
12	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.415 -

(a) "All aircraft shall be equipped with instrument flying inclosures that can be opened and closed in flight."
(b) "The inclosures shall be permanently installed or stowed within the aircraft."
(c) "The sheeting shall be easily removable so that it can be installed after take-of

Deviation:

(a) The instrument flying inclosure will be the two color view limiter type, which does not permit opening and closing in flight.
(b) The instrument flying inclosure will not be permanently installed or stowed within the aircraft.
(c) It will not be possible to install the instrument flying inclosure after take-off or remove before landing.

Reason for Change and Remarks:

(a) The configuration of the cockpit and the windshield precludes the possibility of the instrument flying inclosure being readily opened or closed in flight.
(b) It is impractical to permanently install two-color view limiter type instrument flying inclosure. Stowage of the inclosure within the aircraft is precluded by space limitations.

Effective on A/C Ser. Nos. 54-1351 thru 56-2331

AIRPLANES AFFECTED:

BY R A Martin

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Page 3 of 3

SPECIFICATION CHANGE NOTICE

FINAL
31 March 1958

PEC NO. ZD-8-004A

ILE OPPOSITE PAGE NO. 101 (Cont)

DATE 30 April 1957

HANGE (ECP) NO. 1229

MODEL TF-102A

REVISED

ONTRACT AF33(600)-31174

UTHORITY AND REASON FOR CHANGE: Inclosures, Blind Flying - Deletion of. AMC ltr. MCPHFC(RDZSFG/1-2-6B)HHB/ewt, X1-2A, dtd 4 March 1957. CCN 8N-752(131)

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

	Deviation	Paragraph	AMC Manual 80-1 (Cont)
TO: (Cont)	12	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.415 - "All aircraft shall be equipped with instrument-flying inclosures ....."

Deviation: No instrument-flying inclosure will be provided by the Contractor.

Reason for Change and Remarks: GFAE Blind Flying Hoods, Type MC-1, MIL-H-26866 will be furnished by the Air Force as part of the pilot's personal equipment. Air Force request per AMC ltr. MCPHFC(RDZSFG/1-2-6B)HHB/ewt, X1-2A.

Effective on A/C Ser. Nos. 56-2332 thru 56-2379

Effect on Weight, Balance and Performance: Negligible

AIRPLANES AFFECTED:

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FINAL
31 March 1958

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 101

DATE 30 April 1957

CHANGE (ECP) NO. 1229

MODEL TF-102A

REVISED

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Inclosures, Blind Flying - Deletion of. AMC ltr. MCPHFC(RDZSFG/1-2-6B)HHB/ewt, X1-2A, dtd 4 March 1957. CCN 8N-752(131)

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

	Deviation	Paragraph	AMC Manual 80-1 (Cont)
FROM:	12	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.415 -

(a) "All aircraft shall be equipped with instrument flying inclosures that can be opened and closed in flight."
(b) "The inclosures shall be permanently installed or stowed within the aircraft."
(c) "The sheeting shall be easily removable so that it can be installed after take-off and removed prior to landing when desired."

Deviation:

(a) The instrument flying inclosure will be the two color view limiter type, which does not permit opening and closing in flight.
(b) The instrument flying inclosure will not be permanently installed or stowed within the aircraft.
(c) It will not be possible to install the instrument flying inclosure after take-off or remove before landing.

Reason for Change and Remarks:

(a) The configuration of the cockpit and the windshield precludes the possibility of the instrument flying inclosure being readily opened or closed in flight.
(b) It is impractical to permanently install two-color view limiter type instrument flying inclosure. Stowage of the inclosure within the aircraft is precluded by space limitations.
(c) The configuration of the cockpit and the windshield precludes the possibility of the instrument flying inclosure being readily opened or closed in flight.

AIRPLANES AFFECTED:

BY R A Martin

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
12	3.7.1.3.1	Pilot's Compartment

Requirement: Paragraph 6.415 (a) All aircraft shall be equipped with instrument flying inclosures that can be opened and closed in flight.

(b) The inclosures shall be permanently installed or stowed within the aircraft.

(c) The sheeting shall be easily removable so that it can be installed after take-off and removed prior to landing when desired.

Deviation: (a) The instrument flying inclosure will be the two color view limiter type, which does not permit opening and closing in flight.

(b) The instrument flying inclosure will not be permanently installed or stowed within the aircraft.

(c) It will not be possible to install the instrument flying inclosure after take-off or remove before landing.

Reason for Change and Remarks: (a) The configuration of the cockpit and the windshield precludes the possibility of the instrument flying inclosure being readily opened or closed in flight.

(b) It is impractical to permanently install the two-color view limiter type instrument flying inclosure. Stowage of the inclosure within the aircraft is precluded by space limitations.

(c) The configuration of the cockpit and the windshield precludes the possibility of the instrument flying inclosure being readily opened or closed in flight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

13 3.16.8.2 Interior Lighting

Requirement: Paragraph 6.416 - Lighting -"Instruments in fighter aircraft shall be lighted by ultra violet excitation."

Deviation: Instruments shall be lighted in accordance with Specification No. MIL-L-6423A, except as specified herein.

Reason for Change and Remarks: To conform to later requirements of AMC Manual 80-1.

* * * *

14 3.8.3 Auxiliary Landing Gear

Requirement: Paragraph 7.10 - "Any aircraft equipped with a tri-cycle gear shall be provided with a tail skid or buffer...."

Deviation: A tail skid or buffer shall not be required.

Reason for Change and Remarks: To save weight plus experience with the YF-102 airplane indicates that a tail skid or buffer is not necessary.

* * * *

15 3.8 Alighting Gear

Requirement: Paragraph 7.60 - "Air loads existing at 150% of sea level stalling speed with flaps shall appear to act on the landing gear installation.

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SPECIFICATION CHANGE NOTICE

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Pg 1 of 2

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 103 DATE 15 August 1955

CHANGE NO. 1033 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600) 23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: To bring Specification in Agreement with Airplane as Approved at Mock-up. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

PARAGRAPH NO. CHANGE

APPENDIX II

Deviation Paragraph AMC Manual 80-1 (Cont)

Change to read:

16a 3.8.4.5 Retracting, Extending and Locking Systems - Nose Landing Gear

Requirement: Paragraph 7.610 - "The design shall be such that the wheels are prevented from continuously rotating when in the retracted position. An instruction plate, containing all essential information for the operation of the retracting mechanism (normal and emergency), shall be placed in a conspicuous position in the pilot's cock-pit and other places as required."

Deviation: (1) The design of the nose landing gear will not incorporate a device to prevent rotation of the nose wheel in the retracted position.

(2) An instruction plate covering information on normal and emergency retracting will not be provided in the pilot's Cock-pit.

AIRPLANES AFFECTED: AF54-1351 and Subsequent

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SPECIFICATION CHANGE NOTICE
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Pg 2 of 2

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 103 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)23903, -29264 & 31174

AUTHORITY AND REASON FOR CHANGE: CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

PARAGRAPH NO. CHANGE

APPENDIX II

Deviation Paragraph AMC Manual (Cont)

16a (Cont) Reason for Change and Remarks:

(1) To save weight and simplify design. (Ref RFA No. 8 of TF-102A Nose Mock-up Inspection of 28-29 September 1954).

(2) Contractor has provided a wheel shaped control handle for normal operations and its movement (up for wheels up and down for wheels down) is in accordance with Drawing AD-1 (Sht 3) and Paragraph 6A-120 of ARDCM 80-1, dated Jan 1954. (Dev. Approved by AMC Ltr. MCPHFC(WCSF-6/1-3) RGA/jc dated 9 Dec 1954).

- -

NOTE: Deviation No. (1) was approved in the Model Specification ZD-8-004A dated 15 Nov 1954.
Deviation No. (2) is being added to the model specification by this change. However, the deviation was approved by AMC ltr. MCPHFC(WCSF-6/1-2) RGA/jc dated 9 Dec 1954.

AIRPLANES AFFECTED: AF54-1351 and Subsequent

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

15 (Cont) Deviation: Air loads existing at 270 knots, shall appear to act on the landing gear installation.

Reason for Change and Remarks; Since there is no definite stall point as on conventional aircraft, an arbitrary selection of speed is necessary. In addition, this airplane is not equipped with flaps.

* * * *

16 3.8 Alighting Gear

Requirement: Paragraph 7.60 - "It shall be possible to operate the landing gear at all speeds up to 175 percent of the stalling speed."

Deviation: It shall be possible to operate the landing gear at all speeds up to 270 knots.

Reason for Change and Remarks: Due to the flying characteristics of this airplane, it is necessary to design the alighting gear to operate at higher speeds than 175% of stalling speed. Since there is no definite stall point as on conventional aircraft, an arbitrary selection of speed is necessary.

* * * *

16a 3.8.4.5 Retracting, Extending and Locking Systems - Nose Landing Gear

Requirement: Paragraph 7.610 - "The design shall be such that the wheels are prevented from continuously rotating in the retracted position."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
16a (Cont)	Deviation:	The design of the nose landing gear will not incorporate a device to prevent rotation of the nose wheel in the retracted position.

Reason for Change and Remarks: To save weight and simplify design. (Ref RFA No. 8 of TF-102A Nose Mock-Up Inspection of 28-29 September 1954.)

* * * *

17	3.8	Alighting Gear
	Requirement:	Landing Gear Retracting Mechanism - Paragraph 7.611, Landing Gear Controls-"Controls shall conform to Chapter 9,Controls". Paragraph 9.5, Wing Flap and Landing Gear Controls -"Wing flaps and landing gear actuating systems shall conform to Chapter 10, Actuating System". Refer to Paragraph 10.4, Mechanical Systems. Paragraph 10.400, Bearings - "All moving joints between push-pull rods, levers and brackets shall have anti-friction bearings in accordance with Paragraph 8.31, Anti-Friction Bearings."
	Deviation:	Plain bearing with adequate lubrication facilities, where practical, and consistent with acceptable alighting gear practice may be used, providing satisfactory information is submitted to and approved by WADC substantiating their use.

Reason for Change and Remarks: Anti-friction bearings would impose impracticable installation problems and excessive weight due to the large design loads and limited space.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
18	3.16.11.2	Signal Assemblies

Requirement: Paragraph 7.611a - "The landing gear indicating system shall be in accordance with Specification No. 32300.

Deviation: The landing gear indicating system shall be installed in accordance with Specification No. MIL-E-7563 as deviated in this appendix.

Reason for Change and Remarks: To specify applicable specification.

* * * *

19	3.8.2.5	Retracting, Extending and Locking Systems

Requirement: Paragraph 7.611k - "Leakproof sealed units, using AF approved low travel switches (reference Specification MIL-S-6743), shall be installed on the main landing gear in such a manner that the initial compression motion of the shock absorber actuates the switch. The purpose of these switches is to prevent retraction of the landing gear while the airplane is on the ground. They shall be wired in series with each other and shall be capable of being adjusted to operate at 1/2 inch plus 1/4 inch minus 0 inch from the shock strut fully extended position. These shall serve to operate a continuous duty type solenoid for unlocking the landing gear control lever."

Deviation: A safety switch shall be required on the left hand main landing gear shock strut only.

Reason for Change and Remarks: The Contractor's experience has shown that two switches in series decrease the overall circuit reliability as well as increase weight, circuit complication

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

19 (Cont) Reason for Change and Remarks (Cont) and maintenance access problems. Practicability of a switch on the left main gear is borne out by YF-102 flight tests to date.

* * * *

20 3.8.2.6 Main Landing Gear Doors and Fairings
3.8.4.6 Nose Landing Gear Doors and Fairings

Requirement: Paragraph 7.701a - "Landing gear doors shall be designed to close when the landing gear is in the fully extended position."

Deviation: The landing gear doors need not be designed to close when the landing gear is in the fully extended position.

Reason for Change and Remarks: The above requirement is basically for aircraft with low thrust to reduce drag during take-off. Also, due to the increase in weight and the complexity in design, it is not deemed advisable to comply with the above requirement. To maintain design identical to F-102A airplanes.

* * * *

21 3.2.11 Standard Parts

Requirement: Paragraph 8.101 - Threads - "Threaded holes in fitting shall be avoided due to high original cost and the limited serviceability of the fittings. The attachment of fittings to the aircraft structure shall not involve the use of extensive threaded surfaces."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
21 (Cont)	Deviation:	Where threaded holes in fittings, structure, or bosses cannot be avoided, the part shall be designed to permit machining and threading for the next larger size standard screw thread, or shall employ removable externally-threaded inserts, for the purpose of replacing the working threads.
	Reason for Change and Remarks:	To reflect later USAF policies as evidenced in July 1951 revision of HIAD.

* * * *

22	3.2.11	Standard Parts
	Requirement:	Paragrapah 8.20 - Rivets - "All rivets must conform to those shown in the Army Air Forces Standards Book."
	Deviation:	(a) All rivets must conform to those shown in the USAF Standards book and ANA Bulletin 147. (b) Corrosion-resistant steel rivets conforming to Contractor's Standards Q-4304 and Q-4310 may be used. (c) DuPont Blast Free rivets including those with shaved heads may be used subject to the provisions of AMC letter MCPPAF-6 (WCSF-6) dated 4 December 1953, and MCPPAF -6 (WCSF-6) dated 24 July 1954. (d) Huck lockbolts may be used subject to the provisions of AMC letters to Huck Manufacturing Co, MCREXA71 dated 22 November 1949, MCREXA71 dated 14 January 1949, MCREXA71 dated 26 March 1948 and TSEAC 11B dated 1 July 1947.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
22 (Cont)	Deviation: (Cont)	(e) Series 200 and 260 Jo Bolts may be used subject to the provisions and limitations of WADC letter WCLSJ-3 dated 18 August 1954 to National Screw and Manufacturing Co of California. (f) Contractor's Q-4326 rivets installed per Contractor's Standard Q-2008 with Q-7106 washers may be used in construction of integral fuel tanks.

Reason for Change and Remarks:

(a) To add more recent standard fastenings now recognized by USAF.

(b) These Contractor standards have been approved by AMC letter.

(c) Blind fasteners are necessary and duPont blast-free rivets require less back clearance and prevent corrosion from products of explosion.

(d) To provide a high strength fastener with adequate clamp-up, to avoid the weight penalty of screw and nut combinations in permanent joints, and to provide tighter fits.

(e) To provide a high strength blind fastener and to avoid the weight penalty of screw and nut plate combinations in permanent joints.

(f) These rivets are required for fabricating of integral fuel tanks in accordance with Contractor's Report No. 8-00010 submitted to WADC and approved.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
23	3.2.11	Standard Parts

Requirement: Paragraph 8.21 - Bolts - "AN standard bolts and screws shall be used in the primary structure of the aircraft."

Deviation: (a) AN standard bolts and screws and the standard bolts and screws listed in ANA Bulletin 147 shall be used in the primary structure of the aircraft. In addition, the MS 20,004 series bolts may be used.

(b) Corrosion-resistant screws may be used.

(c) "Nylock" self-locking bolts and screws may be used subject to the provisions of WADC letter to the Nylock Corp WCLSJ-3 dated 18 March 1954.

Reason for Change and Remarks:

(a) To add later, more convenient fasteners recognized by industry and the services.

(b) Corrosion-resistant screws are for use in the vicinity of compass installations where nonmagnetic materials are required.

(c) Nylock screws to be used in order to keep windshield post sizes to a minimum in order to keep within Mock-Up requirements. (Reference Convair letter 6-3137 dated 16 July 1953 and AMC letter MCPPAF-6 (WCOWF-6)dated 18 August 1953).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
24	3.2.11	Standard Parts

Requirements: Paragraph 8.21 - Bolts "Bolts loaded in shear and subject to reversals of load shall be installed to close tolerance holes with no perceptible play."

Deviation: Shear bolts in pin-jointed structures subject to reversals of load shall be installed in close tolerance holes with no perceptible play. The term "no perceptible play" is interpreted as the actual hole diameter not exceeding the nominal bolt or pin diameter by more than 0.0015 inch for bolts or pins of 1.000 inch diameter or less, and by more than 0.0020 inch for bolts or pins with diameters larger than 1.000 inch up to and including 1.625 inch.

Reason for Change and Remarks: To define the requirements stated above in accordance with the Contractor's practice.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
25	3.2.11	Standard Parts

Requirement: Paragraph 8.22 - Nuts: "All nuts used in aircraft structures which may require removal shall be either castellated nuts conforming to Specification No. MIL-N-6034, to be locked with cotter pins, or self-locking nuts conforming to Specification No. AN-N-5 or AN-N-10.

Deviation: Applicable, except that nuts for NAS series bolts may be used, and except that nuts for corrosion and heat-resistant screws may be used.

Reason for Change and Remarks: To permit use of nuts corresponding to nonstandard bolts and screws authorized.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
26	3.2.11	Standard Parts

Requirements: Paragraph 8.221 - Self-Locking Nuts: Self-locking nuts and plate nuts shall be of an approved type, selected from those listed in ANA Bulletin 159.

Deviation: Elastic Stop Nut Corporation, Flush, 100°, Slotted Nut No. 52-1650-02 may be used.

Reason for Change and Remarks: To permit the removal of thin structural parts such as Fin Tip sections for repairs and maintenance.

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APPENDIX II

DEVIATIONS FROM APLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
27	3.2.11	Standard Parts

Requirement: Paragraph 8.24 - (1) "Taper pins shall be used in all permanent connections seldom broken and where absence of play is essential." (2) "Cylinder pins may be used... They shall be safetied by peening the ends into shallow countersunk recesses."

Deviation: (1) The use of springpins shall be permitted providing they are installed in accordance with Specification MIL-P-10971 (ORD.), and MS 33547 (ASG).

(2) When cylindrical pins are used safetying may be by staking.

Reason for Change and Remarks: (1) Springpins are lighter in weight and are easier to remove when necessary to do so. Also, the use of rollpins simplifies fabrication. (2) Contractor prefers the staking safetying method since it is more practical both time and cost-wise and is a method used universally.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
28	3.2.11.1	Bearings

Requirement: Paragraph 8.31 - "Control surface hinges and all moving joints between push-pull rods, levers, and brackets shall have anti-friction bearings in accordance with Specification AN-B-4 and Air Force-Navy Aeronautical Standard AN200, AN201, AN206, and AN207."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
28 (Cont)	Deviation:	(1) Applicable except that spherical self-aligning bearings may be used for actuating cylinder pivots. Relubrication shall be provided where practicable. Each specific application shall be submitted to WADC for approval.
		(2) Shafer - Self aligning - Double row - positive seal Series "A" bearings may be used in Elevon and Rudder hinges. Each specific application shall be submitted to WADC for approval.
		(3) Fafnir - Self aligning - Sealed ball bearing - Series KP-49-BS may be used on lower rudder hinge. Self aligning portion shall be used for assembly misalignment only.
		(4) Plain bearings with adequate lubrication facilities, where practical and consistent with acceptable alighting gear practice may be used. Each specific application shall be submitted to WADC for approval.
		(5) Fafnir bearings of the DW series may be used in the primary controls.
		(6) Fafnir rod ends of the RE series may be used on push-pull rods in the primary and secondary controls.

Reason for Change and Remarks: (1) Anti-friction bearings would impose impraticable installation problems and excessive weight due to the required large design loads.

(2) Space limitations require these bearings and reflect appreciable weight savings.

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

28 (Cont) 3.2.11.1 Bearings (Cont)

(3) No AN Bearings of this size, type and capacity available.

(4) Anti-friction bearings would impose impracticable installations problems and excessive weight due to the required large design loads.

(5) To simplify design, reduce control system play and save weight.

(6) To reduce control system play.

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29 3.2.11.1 Bearings

Requirements: Paragraph 8.312 - "The static limit loads for anti-friction bearings shall not exceed the minimum non-Brinnell loads given in Specification AN-B-4."

Deviation: The following shall be the bearing limit load ratings:

Bearings	Limit Load Ratings
AN 200KP Series	8,000ND^2
AN 201KP Series	8,000ND^2
AN202KP Series	8,000ND^2
AN 200KS Series	4,000ND^2
AN 206DSP Series	3,000ND^2
Ball Bearing Rod Ends	3,000ND^2

N = Number of Balls
D = dia of balls

Reason for Change and Remarks: The above loads are those approved by WADC Ltr WCSWF 1/WCS/HLM dated 18 Aug. 1952.

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CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
30	3.20.1.2	Ground Air Conditioning

Requirement: Paragraph 8.412 - "An opening in the engine cowling for ground heaters will be provided for, by either an accessory door with minimum dimensions of 12 inches diameter or an easily removable section of cowling of equivalent size."

Deviation: No engine cowling is required. However, provision shall be made for ground heating of the accessory compartment.

Reason for Change and Remarks: Engine cowling is not applicable to this type of power plant installation. Means will be provided for obtaining ground heat for engine accessories.

* * * *

31	3.4	Structural Design Criteria

Requirement: Paragraph 8.42 - "Cowling and its supporting structures shall be designed to the strength requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria For The TF-102A Airplane" Which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

32 3.2.11 Standard Parts

Requirement: Paragraph 8.440 Quick Acting Fasteners - Cowling fasteners used on the external surfaces of Aircraft in attaching cowling, inspection doors, etc., shall be flush with the surface, with the fasteners in the locked position, and shall conform to Specification AN-F-8. They shall be selected from the approved fasteners covered by ANA Bulletin 248 and Standard Sheet and 10076.

Deviation: It shall be permissible to use shear type camloc fasteners. Drawings of each application shall be submitted for approval.

Reason for Change and Remarks: To provide quick removal of access doors, to permit carrying normal fuselage shear with a minimum of space and weight being utilized. (Approval obtained in AMC Ltr dated 24 December 1953).

* * * *

33 3.22.4 Hoisting

Requirement: Paragraph 8.511 - Hoisting. - "Hoisting slings shall be provided and carried as special equipment."

Deviation: Provision for carrying hoisting slings in the airplane is not required.

Reason for Change and Remarks: Insufficient space in the airplane available for stowage.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
34	3.20.1.2	Ground Air Conditioning

Requirement: Paragraph 8.52 - Ground Handling. ".... provisions will be made in the aircraft fuselage at applicable stations requiring ground heating for attaching of AF standard 12-inch ground heater duct."

Deviation: Provision for attachment of the specified ground heater ducts is not required.

Reason for Change and Remarks: Provision shall be made for obtaining ground heat for the cockpit as described in this model specification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
35	3.4	Structural Design Criteria

Requirement: Paragraph 8.520 - "The alighting gear and its supporting structure shall be designed to the towing requirements of Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria For The TF-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 118 DATE 6-7-55

CHANGE NO. 1029 MODEL TF-102A REVISED. 30 September 1955

CONTRACT AF33(600)-23903, 29264

AUTHORITY AND REASON FOR CHANGE: CCN 6N-1107(#181), 6N-1108(#38), 6N-1109(#8) dtd 18 Aug. 1955
Convair requested - Stowage in airplane not desirable.

PARAGRAPH NO.		CHANGE
Deviation No.	Paragraph No.	AMC Manual 80-1 (Cont)
Add: 36 (Rev.)	3.22.3	Mooring Provisions
	Requirement:	Paragraph 8.521 (1) "When detachable fittings are furnished, they shall be securely fastened in the baggage or tool compartment." (2) "The mooring fittings and the structure to which they are attached shall be designed in accordance with Specification No. C-1803 ...."
	Deviation:	(1) Mooring fittings shall not be carried in the airplane. (2) The requirements of Specification No. C-1803-E, Amendment No. 2 shall be as outlined in Contractor's Report No. ZU-8-023 "Stress Analysis Criteria for the F-102A Airplane" which is subject to WADC Approval.

Reason for Change and Remarks: (1) Baggage and/or tool compartment is not provided. The performance of an interceptor type fighter should not be reduced by carrying equipment nonessential to the completion of a combat mission.
(2) To clarify specification requirements and to indicate method of complying with this specification.

See Specification Change Notice, page 178 for effect on Weight, Balance and Performance.

AIRPLANES AFFECTED: 54-1351 and on BY

APPROVED BY

FORM 6188-2

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
36	3.4	Structural Design Criteria

Requirement: Paragraph 8.521 - " The mooring fittings and the structure to which they are attached shall be designed in accordance with Specification No. C-1803 ......"

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria For The TF-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

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37	3.22.3	Mooring Provisions

Requirement: Paragraph 8.521a - (1) "A mooring fitting shall be provided on the fuselage of each aircraft near the tail." (2) "For aircraft of 16,000 poinds design gross weight or less, mooring fittings attached to the wing, one on each side of the plane of symmetry and as near as practicable to the middle of the semispan, shall be provided. For larger aircraft, two wing mooring points on each side of the plane of symmetry shall be provided."

Deviation: (1) Mooring fitting on the fuselage tail shall not be required.
(2) One wing mooring point on each side of the plane of symmetry shall be provided.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

37 (Cont) Reason for Change and Remarks: (1) Due to Delta wing configuration, aft mooring provisions are incorporated in the outboard end of wing. (2) Due to the short wing span it is not practical to provide two mooring points on each side.

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38 3.22.5 Leveling:

Requirement: Paragraph 8.531 (Leveling Provisions) - "Each aircraft shall be furnished with provisions for obtaining the true level attitude of the longitudinal and lateral axes of the aircraft while the aircraft is being weighed, while structural alighnment is being made, or while armament is being adjusted and aligned. Provisions for plumb bobs, which permit a free fall of 36 inches, are desired; however, if brackets are used they shall be 18 to 20 inches apart, shall be located on the left side of the fuselage and should be forward of the wing. All jig points and leveling provisions shall be suitably marked or labeled in accordance with Specification AN-M-18."

Deviation: (a) Lateral leveling brackets shall be located symmetrically about center line of airplane.

(b) Longitudinal leveling brackets shall be located in the aft right hand missile bay.

(c) Leveling brackets shall not be located forward of the wing.

(d) Leveling provisions shall be installed in accordance with Specification No. MIL-M-6756.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
38 (Cont)	3.22.5	Leveling (Cont)

(e) Lateral leveling brackets shall be spaced 14 inches apart. Longitudinal leveling brackets shall be 21 inches apart.

Reason for Change and Remarks: (a) and (b) Due to structural and equipment density, it is impractical to locate brackets on left side of airplane.

(c) The delta wing configuration renders it impractical to comply. Leveling provisions shall be forward of the main landing gear.

(d) To establish use of later specification which supersedes AN-M-18.

(e) Spacing chosen permits mounting on existing structure. Conforming to requirement of 18 to 20 inches apart would require additional bracketry with resultant weight increase.

* * * *

39	3.7.1.2	Construction - Fuselage

Requirement: Paragraph 8.62 - "..... if hinged doors are used, the hinges shall be located so that the air stream tends to keep them closed, ..."

Deviation: It shall be permissible to provide access doors hinged at the top along a straight line section with fasteners provided to secure in a closed position, and provided specific application approval is obtained from WADC.

Reason for Change and Remarks: Installation of access doors hinged at top precludes the necessity of additional structure to provide for hinge support on the fore side of the door. This permits weight savings.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
39 (Cont)	3.7.1.2	Construction - Fuselage (Cont)

(Ref. CVAC Ltr 6-1113 of 12 March 1953, AMC MCPPAF-6/RGA/feb dtd 10 May 1954.

* * * *

40	3.2.2	MATERIALS: Magnesium castings.

Requirement: Paragraph 8.640 - "In the design of magnesium alloy castings, wall thickness shall not be less than 5/32 inch, and generous fillets shall be provided at junctures of all sections."

Deviation: Wall thickness of magnesium alloy sand castings may be of 1/8 inch thickness (minimum), subject to WADC approval of each application.

Reason for Change and Remarks: The structural strength of the 1/8 inch thick magnesium alloy sand casting is considered adequate and will result in considerable weight savings.

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41	3.4	Structural Design Criteria

Requirement: Paragraph 8.83 - "For design strength and rigidity requirements see AAF Specification No. C-1803."

Deviation: The requirements of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria for the TF-102A Airplane" which is subject to WADC approval.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

41 (Cont) 3.4 Structural Design Criteria (Cont)

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

42 3.8.2.5 Retracting, Extending and Locking Systems

Requirement: Paragraph 9.14 - "Emergency" controls shall be properly located and safe-guarded to preclude inadvertant operation.

Deviation: Emergency landing gear control shall not be equipped with a guard.

Reason for Change and Remarks: Decision of F-102A Mock-Up Board of 28-29 July 1954. Ref. RFA #39.

* * * *

43 3.10 Surface Control System

Requirement: Paragraph 9.22 - "Whenever push-pull tube systems are used in flight controls, they shall be arranged that all the tubes are in tension for the greater load for which the system is designed."

Deviation: The greater load may be in compression in some cases.

Reason for Change and Remarks: Space available makes it undesirable to complicate the design to meet the above requirement in all cases. (Request submitted by CVAC Ltr 6-5877 dated 30 November 1953, approved by AMC Ltr MCPPAF-6 (WCSF-6) dated 25 January 1954.)

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

44 3.10.1 Primary Flight Control System

Requirement: Paragraph 9.305 - "The locking device shall provide for selective locking of the aileron, elevator and rudder controls and it shall also incorporate the feature of simultaneous locking of all controls at the will of the pilot."

Deviation: The above requirement shall not be applicable.

Reason for Change and Remarks: The above requirements have been deleted by later revisions to AMC Manual 80-1. To comply would unnecessarily complicate the control system and add weight.

* * * *

45 3.4 Structural Design Criteria

Requirement: Paragraph 9.307 - "The design of the control system, and its structural supports, shall be based on rigidity and the elimination of deflection, as well as upon the ultimate strength requirements of Specification No. C-1803."

Deviation: The requirement of Specification No. C-1803-E, Amendment No. 2, shall be as outlined in Contractor's Report No. ZU-8-027 "Stress Analysis Criteria for the TF-102A Airplane" which is subject to WADC approval.

Reason for Change and Remarks: To clarify specification requirements and to indicate method of complying with this specification.

* * * *

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
46	3.10.1	Primary Flight Control System

Requirement: Paragraph 9.308 - "All cables shall be separated by at least 3 inches, preferably more."

Deviation: Cable spacing may be closer than 3 inches where necessary. Each particular case shall be submitted to WADC for approval.

Reason for Change and Remarks: Maximum cable spacing will be provided; however, in some cases it is impracticable to maintain three-inch spacing due to limited space available. (Approved by AMC letter MCPPAF-6 (WCSF-6) RGA/feb dated 29 June 1954.)

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
47	3.10.1	Primary Flight Control System

Requirement: Paragraph 9.31 - Duplicate Controls - "This paragraph, under certain conditions, requires duplicate control system.

Deviation: A single cable control system shall be provided for each of the primary control systems.

Reason for Change and Remarks: The delta-wing configuration requires a control system mixer which does not lend itself to a practical dual system. Dual cable systems will unduly increase the control system friction forces and weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
48	3.10.1.1	Flight Station Controls

Requirement: Paragraph 9.324 - "The aircraft structure, auxiliary controls, furnishings, instruments, etc., shall clear by at least 1-1/2 inches the cockpit primary air control items in all positions...."

Deviation: A minimum clearance of 1-1/2 inches shall be maintained between the control stick grip and aircraft structure; however, the minimum clearance between other control components and aircraft structure may be less than 1-1/2 inches.

Reason for Change and Remarks: Maximum clearance will be provided; however, in some cases it may be impractical to maintain the full clearance specified in the HIAD.

* * * *

49 3.14.1 Instruments

Requirement: Paragraph 9.403 - "Tab position indicators shall plainly identify, by day or night, the main control surface affected by the trim control...."

Deviation: Tab position indicators shall not be required. A single light shall be installed to indicate when surfaces are in neutral (take-off) position. This light shall come on when all of the surfaces are trimmed neutral by the auto-trim switch.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

49 (Cont) Reason for Change and Remarks: USAF request at F-102A Cockpit Conference. The pilot needs only to know trim position prior to take-off.

* * * *

50 3.8.2.5 Retracting, Extending and Locking System (Main Landing Gear)

Requirement: Paragraph 9.521 - "The landing gear control lever shall be installed with a solenoid released locking device which functions to preclude motion of the control lever from neutral to the "up" position when on the ground."

"For hydraulic or pneumatic retracting systems where the landing gear lever operates selector valves electrically by means of a conventional control circuit, a separate "contact" (multi-pole switch) will be closed for each selector valve energized."

Deviation: (1) A solenoid released locking device shall not be required.

(2) A separate "contact" (multi-pole switch) for each selector valve energized shall not be required.

Reason for Change and Remarks:

(1) The safety switch on the main gear prevents the gear from being retracted when on the ground even though the landing gear control switch is moved to the "up" position.

(2) The landing gear control switch shall be in accordance with Contractor's Specification Control Drawing No. 8-04227 which is to be submitted to AMC for approval.

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 127

DATE 13 October 1956

CHANGE (ECP) NO. 1159

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: Throttle Quadrant - Revision to. Contractor initiated, (P&W EC-64444), EWO 4270 (Authorized Engineering Study) VR56-789 dtd 18 May 1956. CCN #63 MSN 7N-4874 dtd 31 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

	Deviation	Paragraph	AMC Manual 80-1 (Cont)
ADD:	50b	3.12.11	Propulsion System Control
		Requirement:	Paragraph 9.603B - "The lever travel shall be not less than 90° nor more than 110° angular movement."
		Deviation:	A pilots power lever angular travel of 78° - 82° for full Military Power position. Power augumentation being accomplished by outboard motion of the power lever without further forward travel.

Reason for Change and Remarks: A "Full Military Power" lever position of 78° - 82° places the power lever in its most advantageous position for cruising or formation flight where minute or critical adjustments of the power lever can adequately be made.

(Effective on A/C Ser. Nos. AF56-2355 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 610C

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

50a 3.12.11 Propulsion System Controls

Requirement: Paragraph 9.603 - Engine Control Units - "For irreversible-type units, it shall be impossible to operate the control from any point in the system other than the hand control."

Deviation: It shall be possible to operate the engine control from any point between the student's and instructor's interconnect and their respective hand controls.

Reason for Change and Remarks: The irreversible-type unit shall be located in the interconnect linkage between the student's and instructor's power quadrant. It is not advisable to incorporate the irreversible unit in the power quadrants because of design complications and resultant increased weight.

* * * *

51 3.12.11 Propulsion System Controls

Requirement: Paragraph 9.604 - "In single-engine aircraft, at least six inches clearance shall be provided between the handle of the throttle lever or power lever and the handle of the control located nearest to it. Training aircraft shall have the controls so arranged that either the instructor (pilot) or student may have complete control."

Deviation: (1) The power control lever clearance may be reduced from the HIAD requirement.

(2) Both the student and instructor shall have control of the range from idle to maximum or take-off power. Only the student shall have control for starting and shut-down.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

51 (Cont) Reason for Change and Remarks:

(1) The ejection seat clearance, landing gear lever, oxygen panel location prevents adherence to this specification.

(2) To reduce weight and complexity no interconnect is provided between the instructor's and student's throttle for sideward motion of the throttle.

The above approved by Mock-Up Board of 28-29 Sept. 1954.

* * * *

52 3.12.11 Propulsion System Controls

Requirement: Paragraph 9.621 - "All turbo-jet aircraft shall be provided...... and having a functional characteristic substantially in accordance with Figure 9.1."

Deviation: Thrust augmentation is in the regime between a point just forward of idle to maximum thrust.

Reason for Change and Remarks: The deviation, as stated, is a requirement of the engine performance for this airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
53	3.16.4 3.16.5 3.16.6 3.16.8	Equipment Installation Wiring Bonding Lighting

Requirement: Paragraph 10.1 - Electrical System - "This paragraph and subsequent subparagraphs specify Specification Nos AN-E-17, 32300, 94-32265, AN-W-14 and AN-B-10 as the applicable specifications."

Deviation: Specifications MIL-E-7080, MIL-E-7563, MIL-L-6503 (USAF), MIL-W-5088 and MIL-B-5087 respectively shall apply.

Reason for Change and Remarks: To specify applicable specifications.

* * * *

Deviation	Paragraph	
54	3.15.2	Pneumatic System

Requirement: Paragraph 10.303 - "Assume air bottle pressure to be 1800 psi. All air bottles used for emergency operation of hydraulic or pneumatic systems shall be selected for an initial air charge of 1800 psi. (Pressure lower than this results in the use of larger size bottle and higher pressure is not available in service.)"

Deviation: Compressed air bottle pressure may be 3000 psi.

Reason for Change and Remarks: To agree with design storage pressure of the pneumatic system

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
55	3.2.11.1	----

Requirement: Paragraph 10.400 - Bearings - "All moving joints between push-pull rods, levers, and brackets shall have antifriction bearings in accordance with Paragraph 8.31, Anti-Friction Bearings."

Deviation: All moving joints between push-pull rods, levers, and brackets shall have anti-friction bearings in accordance with Specification No. AN-B-4 and Air Force-Navy Aeronautical Standard AN-200, AN-201, AN-202, AN-206 and AN-207, except that:

(1) Spherical self-aligning bearings may be used in applications where specific application approval is obtained.

Reason for Change and Remarks: Anti-friction bearings would impose impracticable installation problems and excessive weight due to the required design loads.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
56	3.10.1	Primary Flight Control System

Requirement: Paragraph 10.410 - "Control cables shall conform to Specification No. AN-C-43 or AN-C-48."

Deviation: Hy-Co-Span may be used in lieu of cables conforming to Specification No. AN-C-43 or AN-C-48.

Reason for Change and Remarks: The use of Hy-Co-Span simplifies the system by elimination of tension regulators and reduces weight. (Approved by AMC letter dated 9 April 1954)

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

57 3.10 Control Systems

Requirement: Paragraph 10.412 - "Fairleads shall be used wherever necessary to keep cables from chafing and slapping against parts of the aircraft in flight or in taxiing .... They shall be of nonhygroscopic, nonabrasive material, and split to permit easy removal."

Deviation: It shall be permissible to use fixed fairleads with holes sufficiently large to permit withdrawal of cables.

Reason for Change and Remarks: To reduce friction. (Request submitted by Convair letter 6-5877 dated 30 November 1953, approved by AMC letter MCPPAF-6 (WCSF-6) RGA/met dated 25 January 1954.)

* * * *

58 3.2.11.1 Bearings

Requirement: Paragraph 10.421 - "Ball and socket joints shall not be used in control systems."

Deviation: Spherical self-aligning bearings may be used for actuating cylinder pivots.

Reason for Change and Remarks: Anti-friction bearings would impose excessive installation problems and weight increases due to the required large loads.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
59	3.19.4	Emergency System

Requirement: Paragraph 11.22 - "An overheat detector system shall be installed in all turbo-jet .... in accordance with Specification No. 41409.

Deviation: The overheat detector system shall be as specified by the Procuring Agency.

Reason for Change and Remarks: The Edison continuous detector is used on this airplane to detect overheat in the aft engine compartment.

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60	3.19.2.4	Windshield Cleaners

Requirement: Paragraph 11.31 -'Transparent surfaces, windshield wipers, external anti-icing sprays and heated-air de-icing, defrosting and defogging systems for maintaining vision through the transparent areas which are necessary to the performance of the mission shall conform to Specification No. 40435.

Deviation: Means for maintaining forward vision during rain may be other than by windshield wipers.

Reason for Change and Remarks: Means for maintaining forward vision during rain shall be installed; however, this may be accomplished by a method other than wipers as covered by Specification No. MIL-T-5842.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
61	3.20.1.1.1	Air Conditioning-Pressurization

Requirement: Paragraph 12.22 - "Safety limits of pressurization and Figures 12-2 and 12-3."

Deviation: Maximum rate of expansion limits as specified in Paragraph 12.22 and Figures 12-2 and 12-3 are not applicable for pilot emergency escape from the aircraft.

Reason for Change and Remarks: To keep the RGE within the specified limits, a time delay of approximately two seconds would be required to shut off the cabin air supply and dump the cabin pressure down to a safe level before opening canopy. This time delay is excessive for an emergency escape.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
62	3.20.1	Air Conditioning

Requirement: Paragraph 12.30 - ".... provision shall be made for selecting automatic maintenance of a lower pressure differential during combat flight in accordance with requirements of Paragraph 12.22, Safety Limits of Pressurization.

Deviation: A lower pressure differential during combat flight is not provided.

Reason for Change and Remarks: The intent of this requirement is met by pressure suit provisions.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

63 3.20.1 Air Conditioning

Requirement: Paragraph 12.341 - "Closing of the shut-off valves shall actuate simultaneously the ram air-inflow valve mechanism so as to insure continued cabin ventilation when the pressure source is not used."

Deviation: It shall not be required that the closing of the shut-off valve simultaneously actuates the ram air-inflow valve mechanism.

Reason for Change and Remarks: Simultaneous actuation of the ram air-inflow valve mechanism with operation of the emergency shut-off valve would dump the cockpit pressure with attendant adverse physiological consequences at high altitudes.

* * * *

64 3.20.1 Air Conditioning

Requirement: Paragraph 12.342 - "A valve in the ram air line shall be mechanically or electrically linked with both the emergency pressurized air shut-off valve described in 12.341, Emergency Shut-Off Valve, and the cabin air dump valve described in 12.360, General. The linkage shall provide for positive actuation of the threee valves when operating personnel desire to actuate any one of the three."

Deviation: A valve in the ram air line shall be electrically linked with the cabin air dump valve and the emergency shut-off valve. Actuation of the cabin air switch to "RAM" actuates all three valves.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

64 (Cont) Reason for Change and Remarks: Actuation of cabin air switch to "Off" position closes emergency shut-off valve, but does not open dump valve or ram air valve, thus holding cabin air pressure which is in conformance with deviation requested, for Paragraph 12.341 of HIAD.

* * * *

65 3.20.1 Air Conditioning

Requirement: Paragraph 12.345 - "Water separator and drain."

Deviation: Water separator and drain are not required.

Reason for Change and Remarks: Provision for water separator is deemed inadvisable because of the extremely short duration of sea level flight in the normal tactical application of the airplane. Such provisions impose penalties in weight and space of the low pressure pneumatic system.

* * * *

66 3.20.1.1.1 Air Conditioning

Requirement: Paragraph 12.350 - General - "The cabin pressure to be maintained at various flight altitudes shall be as shown in Figure 12-4 for aircraft having one or two crew members, etc."

Deviation: The cabin pressure schedule will be as per Paragraph 3.20.1.1.1.

Reason for Change and Remarks; This pressure schedule provides more adequate cockpit pressures for pilot environment at altitude.

* * * *

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
67	3.20.1	Air Conditioning

Requirement: Paragraph 12.351 - "Control of rate of pressure change."

Deviation: Control of rate of pressure change need not be provided.

Reason for Change and Remarks: The necessity for switching from normal to combat is deleted to maintain design identical to F-102A airplane.

* * * *

Deviation	Paragraph	
68	3.20.1	Air Conditioning

Requirement: Paragraph 12.372 - Cabin Air Inflow and Mixing Flow Package for Jet-Propelled Aircraft. - "The cabin flow and mixing valve package shall comprise a dual valve arrangement.."

Deviation: Considered not applicable per reason noted.

Reason for Change and Remarks: The single butterfly refrigeration unit bypass valve performs the intent of the above requirement.

* * * *

Deviation	Paragraph	
69	3.20.1	Air Conditioning

Requirement: Paragraph 12.376 - (Referring to Specification R-40659-A, Heating, Aircraft Cabin General Specification for; Paragraph D-1b.) - "The temperature of each crew station and the cargo or passenger compartment shall not vary more than 10 degrees Fahrenheit (5.5 degrees Centigrade) between any two points ...."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

69 (Cont) Deviation: The air temperature in the cabin may vary more than 10 degrees Fahrenheit between any two points. The distribution system will maintain air temperatures immediately surrounding the pilot as uniformly as practical.

Reasons for Changes and Remarks: In a high performance, high altitude aircraft of this type, it is not practical to maintain temperature gradients within ±5 degrees Fahrenheit of the average.

* * * *

70 3.20.1 Air Conditioning

Requirement: Paragraph 12.51 - "Maximum ventilating air rate will usually be determined by cabin temperature requirements, but shall be limited to that value which will not permit air movement past seated crew members at more than 200 feet per minute air velocity."

Deviation: Air Movement past seated crew members shall be kept to a minimum but may exceed 200 feet per minute air velocity.

Reason for Change and Remarks: Due to the small cockpit size and high flight speeds, the air flow necessary for conditioning the cockpit at altitudes will produce local air velocities in excess of 200 feet per minute.

* * * *

71 3.12.9.6 Piping and Fittings

Requirement: Paragraph 13.30 - "The piping and connections utilized in the power plant installation shall conform to the types indicated in Figure 13.2."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

71 (Cont) Requirement (Cont) Paragraph 15.66 - "Combustible fluid lines in the engine compartment shall be of stainless steel or flame-resistant hose construction. The hose shall conform to Specification No. AN-H-24."

Deviation: (1) Aluminum alloy fuel lines may be used throughout the fuel system as approved by comment on RFA #77 at YF-102 CTCI Board of 3 March 1954.

(2) Where required, flexible stainless steel hose may be used in lieu of rubber hose.

Reason for Change and Remarks:

(1) In the interest of weight saving, the Contractor recommends the use of aluminum alloy tubing for fuel lines in lieu of stainless steel tubing or hose. The aluminum tubing used is not affected by normal operating temperatures, therefore, adequate structural strength is maintained.

(2) Flexible stainless steel hose is lighter, more durable and will withstand higher pressures than rubber hose.

* * * *

72 3.12.9.6 Wall Thickness, Aluminum Alloy

Requirement: Paragraph 13.311 - "Nominal wall thickness of aluminum alloy tubing shall be ...."

Deviation: Fuel system tubing minimum wall thickness may be 0.035 for 2.00, 2.50 and 3.00 inch aluminum alloy tubing.

Reason for Change and Remarks: Compliance with the January 1954 version of the AMC Manual 80-1 is requested in order to save appreciable tubing weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

73 3.12.9.6 Wall Thickness, Stainless Steel

Requirement: Paragraph 13.312 - "Nominal wall thickness of stainless steel tubing shall not be less than .... etc."

Deviation: The wall thickness of the stainless steel tubing shall be consistent with fluid pressure requirements. In no case shall the proof pressure of the tubing be less than the proof pressure of the equipment installed. In no instance shall the wall thickness of the tubing be less than that required to prevent the collapse of an AND 10060 Style "A" tube bead if clamp-type connectors are used.

Reason for Change and Remarks: Appreciable weight can be saved by selecting tubing in accordance with the above deviation where fabrication permits.

* * * *

74 3.12.9.6 Piping and Fittings

Requirement: Paragraph 13.33 - "All fittings such as hose nipples, elbows, flared tube fittings, etc., shall conform to Army-Navy or Air Force standards. The end fittings used with the hose assembly conforming to Drawing AN 6264 shall conform to Drawing AN 792."

Deviation: Fittings shall be of light weight as approved by WADC.

Reason for Change and Remarks: Light weight fittings are used to save weight.

* * * *

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
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FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 140

DATE 28 February 1956

CHANGE (ECP) NO. 1133

MODEL TF-102A

REVISED 26 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: To deviate from AN-B-2a, Para. D-4e(4), to increase foot force on power brakes. Contractor initiated, CCN #76 MSN 6N-7601, CCN #35 MSN 6N-7602 & CCN #9 MSN 6N-7603, dtd 6-25-56.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force - Navy Aeronautical Specification No. AN-B-2a, dated 20 Aug. 1947 - Brake System, Aircraft (Design of)
ADD:		
*140a	3.8.2.2	Brakes

Requirement: Paragraph D-4e(4) "The brake pedal linkages......"
"b. A foot force of between 15 and 20 pounds will be required to cause initial metering through the power brake valve."

Deviation: b. A foot force of between 24 and 36 pounds will be required to cause initial metering through the power brake valve.

Reason for Change and Remarks:

Application and release of air brake pressure is accomplished by the action of pressure and volumetric displacement of hydraulic oil in tubing between the master cylinder and relay valve. The relay valve incorporates a spring to return the hydraulic oil and thus release or vent the air brake pressure. A compromise was necessary between brake pedal force and brake release time during low temperature operation. A nominal increase in the relay valve spring force over the original design was required to provide adequate brake release or response time.

To provide for production manufacturing variances. A nominal increase in spring force and spring rate tolerances was required over laboratory type tolerances to allow a sufficient production rate. This change also allows interchangeability of the master cylinders with respect to the relay valves without the necessity of matching these two components.

To provide a sufficient brake pedal force to prevent inadvertent brake application when using the rudder pedals with the relatively inflexible cold weather flight boot.

* Effective on All A/C.

AIRPLANES AFFECTED:

BY W. A. Young Jr

APPROVED BY

FORM 618C - 2

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

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SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 140 DATE 15 Sugust 1955

CHANGE NO. 1038 MODEL TF-102A REVISED [illegible]

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor's request per Convair Ltr 6-2955 dated 9 June 1955. CCN #5N-3031(204) CCN #5N-3032([illegible]) CCN #5N-3033([illegible]) CCN #5N-3034([illegible]).

PARAGRAPH NO. CHANGE

APPENDIX II - DEVIATIONS

Add deviation as follows:

Deviation	Paragraph	AMC Manual 80-1 (Cont)
75a	3.12.9.6	Piping and Fittings
	Requirement:	Paragraph 13.340 - "The minimum bend radii for metal tubing shall be in accordance with Drawing AND 10111."
	Deviation:	The minimum allowable bend radii for metal tubing shall be consistent with fabrication methods and system pressure requirements.

Reason for Change and Remarks: Due to the large diameter tubing required, especially in the fuel system, and the limited space, below minimum bend radii are required."

(NOTE: This deviation was approved for the F-102B A/C, as deviation No. 106 in ZD-8-005)

AIRPLANES AFFECTED: All

BY

APPROVED BY

FORM 6188-2

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

75 3.12.9.6 Flexible Connections

Requirement: Paragraph 13.330 - "All flexible hose connections utilizing clamps and nipples shall be in accordance with Drawing AND 10065.

Deviation: Not applicable.

Reason for Change and Remarks: Flexible hoses with clamps and nipples are not used in the power plant installation

* * * *

76 3.12.9.5 Vent System

Requirement: Paragraph 13.344 - "All vents and drain lines shall terminate at a point outside the aircraft, passing through resilient grommets in the engine cowling where necessary to prevent chafing, and they shall be so located or formed that drainage cannot be returned to any part of the aircraft structure or enter the exhaust wash from either upstream or downstream. Drain lines shall be easily accessible for draining from the outside of the aircraft."

Deviation: Drains and vents shall be so located that fluids will discharge clear when airplane is in static position.

Reason for Change and Remarks: Location of engine exhaust with respect to the engine drains makes compliance with this requirement impossible.

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APPENDIX II

DEVIATIONS FROM APLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1
77	3.12.9.3	Tanks (Fixed) Fuel

Requirement: Paragraph 13.410 - "All combat aircraft including fighter, attack, photographic, cargo (personnel carriers), and bombardment, that have a tactical operating radius of action of fewer than 3,000 nautical miles shall have internal combustible fluid tanks that afford 100% protection against gunfire for the power plant fluid systems. "Means shall be provided for internal and external purging....."

Deviation:
(a) Self-sealing tanks are not provided.
(b) Fuel tanks are pressurized.
(c) Internal and external purging is not required.

Reason for Change and Remarks; (a) Self-sealing tanks reduce fuel capacity and increase weight. (b) High altitude operation requires pressurization to prevent fuel vaporization. Pressure is used for fuel transfer between tanks. (c) Due to the type of airplane, high speed and altitude operation, and low wing tank frontal area, fuel tank purging has been eliminated to save weight.

* * * *

Deviation	Paragraph	AMC Manual 80-1
78	3.12.9.3	Availability of Liquid

Requirement: Paragraph 13.415 - "All tanks shall be carefully designed to insure that all of the contained liquid will be useable..."

Deviation: The fuel tanks shall be designed so that there will be a minimum of unuseable fuel.

Reason for Change and Remarks: It is impractical to design the integral tanks and equipment so that all of the fuel will be useable in level flight. The unuseable fuel will be as defined in the detail airplane specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

79 3.12.9.12 Filler Openings

Requirement: Paragraph 13.425 (entire paragraph).

Deviation: Not applicable.

Reason for Change and Remarks: The fuel tanks are filled by single point pressure refueling only. (Reference Convair letter 6-3490 dated 1 July 1952.)

* * * *

80 3.12.9.9 Tank Gage Units

Requirement: Paragraph 13.426 - "Fuel tanks shall be provided with a flange suitable for mounting a gage unit in accordance with Specification No. AN-G-19.

Deviation: The fuel tank gage system shall be in accordance with Contractor's Specification No. 8-02305.

Reason for Change and Remarks: The capacitor-type fuel gage system does not require a flange as per above requirement.

* * * *

81 3.12.8.1.1 Oil Tank Accessibility

Requirement: Paragraph 13.431 -

(a) "It definately shall not be necessary to remove the engine .... prior to removal of any tank."

(b) "It shall be possible to remove any fuel tank .... within 4 hours."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

81 (Cont) Deviation: (a) It shall be permissible to remove the engine prior to the removal of the oil tank.

(b) Not applicable.

Reason for Change and Remarks: (a) The oil tank is an integral part of the engine. It is impracticable to provide access throughout the fuselage to permit removal of the tank with the engine installed in the airplane.

(b) The fuel tanks are built as an integral part of the wing structure.

* * * *

82 3.5.1 Wing - Description and Components

Requirement: Paragraph 13.74 - "Integral fuel tanks which consist of the aircraft structure sealed by means of elastic films, gaskets, caulking compounds, etc., (as differentiated from 'bladder' type cells), shall not be used in Air Force aircraft."

Deviation: Integral fuel tanks shall be used.

Reason for Change and Remarks: Considerable previous experience by this Contractor in designing and fabrication of integral fuel tanks, both military and commercial application, have shown them to be satisfactory. Integral tanks provide maximum fuel capacity and minimum weight. Integral fuel tanks shall be fabricated in accordance with Convair Report No. 8-00010, which was approved by AMC letter MCPPAF-6 (WCSF-6) RGA/feb dated 27 May 1954.

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APPENDIX II

DEVIATIONS FROM APLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1
83	2.2	Applicable Specifications

Requirement: Paragraph 15.15 Power Plant Testing - "One aircraft of each model, as determined by the procuring agency will be subjected to a complete set of ground and flight tests in accordance with AMC Engineering Division Memorandum Report No. TSEPP-506-122."

Deviation: Power Plant testing shall be in accordance with AMC Engineering Division Memorandum Report No. WCNEI-525-460 dated 15 June 1951.

Reason for Change and Remarks: AMC Engineering Division Memorandum Report No. TSEPP-506-122 has been superseded by Memorandum Report No. WCNEI-525-460.

* * * *

Deviation	Paragraph	AMC Manual 80-1
84	3.11	Engine Section

Requirement:
Paragraph 15.26 - "Quick-Change Power Plant"
Paragraph 15.270 - "Quick-Change Requirements"
Paragraph 15.28 - "Maintenance - Inspection, Cleaning and Adjustment"
Paragraph 15.29 - "Maintenance - Removal and Replacement"

Deviation: Requirements of above shall be as approved by the YF-102A CTCI Board.

Reason for Change and Remarks: CTCI Board is to determine degree of compliance with above requirements.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
85	3.12.9.3	Tanks (Fixed)

Requirement: Paragraph 15.412 - "Aluminum and aluminum alloy shall be protected from corrosion with corrosion-resistant cartridge conforming to Drawing No. AN-4043."

Deviation: Anti-corrosion cartridge will not be used.

Reason for Change and Remarks: Design of fuel tanks will not accommodate AN cartridge.

* * * *

Deviation	Paragraph	
86	3.12.9.3	Tanks (Fixed)

Requirement: Paragraph 15.421 - "The fuel-outlet fitting from all fuel tanks, except external jettison tanks, shall be a booster-pump flange......."

Deviation: Booster-pump flange shall not be required on tanks 1 and 2, left and right.

Reason for Change and Remarks: The booster pump is installed within No. 3 tank. Booster pumps are not used in tanks No. 1 and 2: The No. 3 tank configuration does not permit use of booster pump flanges as an outlet fitting.

* * * *

Deviation	Paragraph	
87	3.12.9.3	Tanks (Fixed)

Requirement: Paragraph 15.422 - "Each fuel tank shall be provided with a sump --------."

Deviation: No separate fuel tank sump shall be provided.

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
87 (Cont)	Reason for Change and Remarks:	Since the fuel tank is built integrally with the wing structure, it is not possible to provide a sump without extending into the air stream. Sediment and water can collect in the unusable fuel space, for which there are drain provisions.

* * *

88	3.12.9.5	Vent System
	Requirement:	Paragraph 15.424 - "One vent connection shall be installed for each fuel tank and located at the high point of the tank when the aircraft is in normal ground position."
	Deviation:	Conventional type vent system shall not be provided.
	Reason for Change and Remarks:	Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

* * *

89	3.12.8.1	Lubricating System - Description and Components
	3.12.9.13	Refueling Provisions
	Requirement:	Paragraph 15.425a - "Cap shall conform to AAF Drawing No. 39B5435 with an adapter in accordance with AAF Drawing No. 39B5294 or 44B13830."
	Deviation:	Fuel and oil caps may be other than that specified, which are no longer acceptable for new installations.

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

89 (Cont) Reason for Change and Remarks: Inasmuch as pressure refueling only is being provided, a special light-weight bayonet locking cap will be used on the pressure refueling fitting. The oil cap, as approved by WADC, shall be as furnished with the engine in accordance with applicable engine specifications.

* * * *

90 3.12.8.1.1 Oil Tank Accessibility

Requirement: Paragraph 15.431 - "Oil tank shall be changed within 30 minutes."

Deviation: Not applicable.

Reason for Change and Remarks: (Reference deviation requested for Paragraph 13.431) As the tanks are an integral part of the engine, this requirement does not apply with the engine installed. With the engine removed, the oil tank is readily removable.

* * * *

91 3.11.5 Firewalls

Requirement: Paragraph 15.61 - Engine Isolation - "Each engine installation of all aircraft, regardless of the number or relative position of the engines, shall incorporate a stainless steel diaphragm that separates the burner and tailpipe section from accessory section."

Deviation: It shall be permissible to use titanium in lieu of stainless steel for firewalls or shrouding.

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1(Cont)

91 (Cont)

Reason for Change and Remarks: Titanium is recognized as a suitable material for firewalls and shrouds where redundant structure is involved. Considerable weight saving can be obtained by using titanium in lieu of stainless steel.

* * * *

92 3.11 Engine Section

Requirement: Paragraph 15.62 -

(1) "All fuel tank compartments (considering each group of connected cells as a tank), engine compartments, interior of wing, and interior of fuselage proper shall be isolated from each other with a liquid, gas, and firetight seal."

(2) "All fuel tanks .... shall be fitted with drains at all low points at least 1/2 inch in diameter."

Deviation: (1) A vertical aluminum alloy bulkhead shall be installed forward of the engine compressor inlet. A horizontal aluminum alloy shroud, extending aft from the bulkhead over the wheel bay, shall be installed. A longitudinal vertical firewall shall be provided between the wing fuel tanks and the engine compartment; seal compartment between wing tank and titanium firewall such that fuel will drain out of the compartment and not enter the engine compartment. Fire-resistant shrouds shall surround the fuel shut-off valves. A fire-resistant shroud shall surround the turbine and afterburner from the engine firewall aft. All the above firewall bulkheads and shrouds will be as liquid and gastight as possible.

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
92 (Cont)	Deviation (Cont)	(2) The fuel tanks shall be fitted with a flush mounted self-locking drain cock which shall have a drain area equal to or greater than a 1/4 inch tube size non-threaded opening.

Reason for Change and Remarks:

(1) The Contractor considers that the above proposed isolation of fuel, engine compartments and fuselage is adequate for this type of airplane. An appreciable weight saving is realized in following this proposal.

(2) Fuel tank drains shall be installed in general accordance with Paragraph 15.422 of AMC Manual 80-1 which requires a 1/4 inch tube size straight thread opening with an approved self-locking drain cock.

* * * *

93 3.12.9.3 Tanks (fixed) - Fuel

Requirement: Paragraph 15.63 - "The inside of the tank compartments should be sprayed with anti-sparking paint such as clear lacquer.

Deviation: Anti-sparking paint shall not be used in conjunction with integral tanks.

Reason for Change and Remarks: The Contractor's past experience shows that anti-sparking paint is of no value.

* * * *

94 3.12.9.10 Drainage Provisions

Requirements: Paragraph 15.63 - "Each compartment will be drained by a 1/2 inch hole at the low point in normal flight attitude and

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | AMC Manual 80-1 (Cont)

94 (Cont) **Requirement:** (Cont) on the ground, using two holes if necessary. These drain holes shall be at least 5 feet away from open exhaust and shall not be upstream or downstream of the exhaust wash."

Deviation: (1) It shall be permissible for the drain holes to be located upstream of the exhaust wash.

(2) Not less than 1/4 inch diameter holes shall be used.

Reason for Change and Remarks:

(1) Due to the configuration of the airplane, it is impracticable to comply with the above requirements. Drain holes will be located upstream of the exhaust wash.

(2) Aerodynamic consideration prevents use of 1/2 inch holes.

* * * *

95 3.11.5 Firewalls

Requirements: Paragraph 15.67 - "Insulating blankets shall be protected from damage during handling by a layer of wire screen on the inside and outside surfaces."

Deviation: Protective wire screenshall not be required on insulating blankets.

Reason for Change and Remarks: The insulating blankets are installed on the inside of the engine mounted shroud; therefore, they are adequately protected from damage during installation and operation of the engine. The insulation is surrounded by inconel foil which is adequate protection during installation of the blankets in the shroud.

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CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
96	3.2.2	Materials
	3.11	Engine Section
	3.11.5	Firewalls

Requirement: Paragraph 15.68 - "All aircraft components, including equipment and structure that might be critically affected by fires occurring in or around the engine, shall be adequately protected by stainless steel shrouding or firewalls."

Deviation: It shall be permissible to use titanium in lieu of stainless steel for firewalls or shrouding.

Reason for Change and Remarks: Titanium is recognized as a suitable material for firewalls and shrouds, also considerable weight saving can be obtained by using titanium in lieu of stainless steel.

* * * *

97	3.11.8	Fire Access Door

Requirement: Paragraph 15.692 - "The door shall be located .... aft of the diaphragm."

Deviation: The fire access door shall be located in a convenient position near the bottom of the fuselage and shall allow the extinguishing agent to discharge into the compressor and accessory section. The location shall be as approved by the CTCI Board.

Reason for Change and Remarks: To offer the maximum protection to the fuselage structure in the event of a fire.

* * * *

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
98	3.11	Engine Section

Requirement: Paragraph 16.12

(1) Maximum temperatures, maximum allowable temperature, structure, aluminum alloy (75S-T), 200°F (93.3°C).

(2) The maximum allowable accessory compartment temperature shall be 160°F (71°C).

(3) The maximum allowable generator temperature 185°F (85°C).

Deviation: (1) It shall be permissible for aircraft structural members of magnesium alloy and 75S-T aluminum alloy to be heated to not more than 250°F.

(2) It shall be possible for the accessory compartment temperatures to reach 250°F maximum.

(3) It shall be permissible for the generator to be in a compartment where the temperature may reach 250°F maximum.

Reason for Change and Remarks:

(1) In some instances aircraft components will reach temperatures in excess of 200°F. Allowance for strength reduction, due to high temperatures, will be made.

(2) and (3) Due to the high speed of this airplane and result of aerodynamic heating, the accessory compartment may reach a maximum temperature of 250°F for short periods of time. The generator procurement specification covers this temperature.

* * * *

CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
99	3.12.7	Cooling System

Requirement: Paragraph 16.130 - "The design of the cooling system shall be such that the cooling airflow is undirectional."

Deviation: The accessory compartment shall be cooled on the ground by reverse air flow through the compartment into the engine inlet duct.

Reason for Change and Remarks: Until the airplane gains sufficient speed to provide ram air for accessory compartment cooling, air flow through the accessory compartment caused by the negative pressure in the engine inlet ducts is the only practical method of cooling, without severe weight penalties.

* * * *

Deviation	Paragraph	
100	3.12.7	Cooling System

Requirement: Paragraph 16.131 - "The cooling air intake for the aft compartment shall be located aft of the engine diaphragm. The intake for the forward compartment cooling system shall not be taken from the engine air induction system duct; this is to prevent flow reversals in the cooling system from supplying heated air to the engine during ground operation.

Deviation: It shall be permissible to utilize air flow from the engine induction system for aft compartment cooling. The forward compartment shall be cooled by air bled off the engine induction system and exhausted at the rear of the airplane.

Reason for Change and Remarks: In order to achieve the lightest, most practical engine installation with the least cooling system drag loss, air is bled off the engine duct for cooling the turbine and afterburner

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

100 (Cont) Reason for Change and Remarks (Cont)

compartment during flight. On the ground, engine compressor air is ducted into the area through a stainless steel duct and shut-off valve. A check valve is inserted in the system to prevent the hot air from the afterburner compartment from entering the engine duct. The air from the accessory compartment being sucked into the engine during ground operation constitutes such a small percentage of the total engine air flow, no adverse effects are experienced.

* * * *

101 3.12.7 Cooling System

Requirement: Paragraph 16.132 - Compartment Cooling (entire paragraph)

Deviation: Cooling air for the aft engine compartment may be taken from the engine inlet duct and ducted to the aft compartment through fibreglas and aluminum ducts which pass through the accessory compartment.

Reason for Change and Remarks: Fire hazard is not increased by use of nonfire-resistant ducting during in-flight operation. Reverse flow through the nonfire-resistant ducting is prevented by a fire-resistant check valve located adjacent to the engine firewall.

* * * *

102 3.12.8 Lubricating System

Requirement: Section 16.2 - Lubrication Systems

Deviation: This section of the handbook is not applicable to this airplane.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)

102 (Cont) **Reason for Change and Remarks:** The turbo-jet engines specified for this airplane are equipped with an integral oil system and no air frame connections are required, except for installing an additional air-to-oil cooler and venting the accessory gear box.

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103 3.12.8.1 Lubricating System - Description and Components

Requirement: Paragraph 16.22 - "The lubricating system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. AN-O-8."

Deviation: The lubrication system and all equipment utilizing engine lubricating oil shall be suitable for use with a lubricant conforming to Specification No. MIL-L-7808.

Reason for Change and Remarks: In accordance with Pratt & Whitney J-57 Information letter No. 43, dated 23 November 1951, the synthetic oil for use in JT3 engines is Pratt & Whitney Specification No. 521, Government Agency Specification No. MIL-L-7808.

✡ ✡ ✡ ✡

104 3.12.8.1 Lubricating System - Description and Components

Requirement: Paragraph 16.262 - Oil Cooler Selection (Same as Oil Cooler Selection under 14.24) - "Oil coolers used in production aircraft shall comply with the requirements of Specification No. AN-C-75."

Deviation: Oil coolers shall conform to Contractor's Specification. The cooler shall be of the plate type in lieu of the tubular type construction.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

104 (Cont) Reason for Change and Remarks: To permit use of latest type coolers to save weight. Contractor's specification to be submitted to WADC for approval.

* * * *

105 3.12.8.1 Oil Cooler Installation

Requirement: Paragraph 16.263c -"The area of the outlet from the oil cooler shall be at least equal to the total inlet area of the engine oil pump."

Deviation: The area of the outlet from the oil cooler shall be large enough to prevent exceeding the engine manufacturer's limit on the oil scavenge pump back pressure.

Reason for Change and Remarks: A weight saving can be effected by the use of smaller lines and fittings while keeping within allowable back pressure limits.

* * * *

106 3.12.8.1 Lubricating System - Description and Components

Requirement: Paragraph 16.263e - "Oil cooler mounting (same as Mounting under 14.252)."

Deviation: Not applicable to type of oil cooler design proposed. The oil coolers shall be vibration tested as specified in Paragraph 4.3.2.8.1 of Convair Specification No. 8-02347.

Reason for Change and Remarks: Mounting requirements specified are not applicable to type of coolers being used.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
107	3.12.8.1	Oil Cooler Installation

Requirement: Paragraph 16.263f - "An approved oil temperature regulating valve which includes a surge protection valve conforming to Drawing No. 12N4103, shall be mounted on the oil cooler."

Deviation: No oil temperature regulating valve shall be provided.

Reason for Change and Remarks: Oil temperature control is accomplished by a temperature control valve on the fuel-oil cooler. The engine system can withstand the maximum back pressures created by cold oil flowing through the cooler core, and the plate type coolers do not require surge or pressure protection.

* * * *

108	3.12.8.1	Lubricating System - Description and Components

Requirement: Paragraph 16.278 - Engine Breather Lines - "This point shall be so located that oil or fumes will not be discharged onto the windshield or flow into the cockpit and shall be visible to the pilot inflight."

Deviation: It is not necessary that the breather line terminate at a point visible to the pilot in flight.

Reason for Change and Remarks: Since the engine breather connection is located approximately 22 feet aft of the pilot, it is not practical to run the breather line forward.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
109	3.12.9.1	Fuel System - Description and Components
	Requirement:	Paragraph 16.302 - "The entire fuel system shall be designed for the use of Specification No. AN-F-58 fuel. It shall also be capable of satisfactory operation with Specifications No. AN-F-32 and AN-F-48 fuels."
	Deviation:	Fuel system shall be designed to operate with fuel covered by Specification No. MIL-F-5624A, Grade JP-4 and in emergency on MIL-F-5572 fuel.

Reason for Change and Remarks: The engine specified for this aircraft is designed to operate on JP-4 fuel normally and on MIL-F-5572 in an emergency with certain airplane performance limitations as specified in 3.12.9.1 herein.

* * * *

110	3.12.9.1	Fuel System - Description and Components
	Requirement:	Paragraph 16.31 - "Design Requirements:"
	Deviation:	In lieu of the requirements set forth in the HIAD, Section 16.31, the fuel system of the aircraft shall be designed as shown on Convair Drawing No. 8-20304, which shall be submitted to WADC for design approval.

Reason for Change and Remarks: Due to the unconventional fuel system, the requirements of the HIAD do not apply.

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CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

111 3.12.9.5 Vent System - Fuel

Requirement: Paragraph 16.34 - Fuel Tank Vent System (Same as Vent System under 14.33) - "Each fuel tank shall have one vent system with one common outlet."

Deviation: Conventional type vent system shall not be provided.

Reason for Change and Remarks: Pressurized fuel tanks are provided. Fuel transfer is accomplished by pressurization.

* * * *

112 3.12.9 Fuel System

Requirement: The fuel system design requirements per 16.32 and the vent system requirements per 16.34, 16.342, and 16.346 of HIAD requires actual airplane tests for installation approval in accordance with Memo Report No. WCNEI-525-460, Section E.

Deviation: The airplane fuel system shall be tested in accordance with the requirements of Convair Report No. ZK-8-029 as approved by USAF and applicable portions of Section E of No. WCNEI-525-460 on a full scale ground system mock-up rig in lieu of the actual airplane.

Reason for Change and Remarks: It is impractical to conduct fuel systems tests on the airplane with this type of installation.

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CONFIDENTIAL

APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

113 3.12.9.5 Vent System

Requirement: Paragraph 16.345 - "For all other tanks, the internal pressure shall not exceed the external pressure by more than 13.6 inches of water. With fuel having a Reid vapor pressure not greater than 7.0 psi, the maximum allowable pressure in the fuel tank during maximum climb rate shall not exceed 54 inches of water and, when airplane is flying at a fixed altitude after climb, the pressure differential shall decrease to 7 inches of water within 20 minutes."

Deviation: The fuel tank internal pressure shall be sufficient to accomplish the transfer of fuel from tank to tank as required for automatic cg control.

Reason for Change and Remarks: This airplane incorporates a tank pressurization system which eliminates the conventional vent system requirements.

* * * *

114 3.12.9.2 Pumps

Requirement: Paragraph 16.351 - "Booster Pumps"

Deviation: The following shall apply in lieu of the requirements specified in paragraph 16.351. Suitable alternating current centrifugal booster pumps procured to the Contractor Specification shall be provided which may not be mounted directly on the bottom of the tank. Drain lines are not required on alternating current pumps.

Reason for Change and Remarks: Conventional booster pump mounting and installation methods cannot be followed due to the depth and location of the fuel tanks.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
115	3.12.9.1	Controls - Fuel System

Requirement: Paragraph 16.352 - "Fuel valve controls shall be marked red . . . . "

Deviation: Fuel valve controls need not be marked red, but shall be suitably identified.

Reason for Change and Remarks: The fuel control panel will utilize edge lighting which does not lend itself for special color identification.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
116	3.12.9.8	Fuel System - Strainer and Filters

Requirement: Paragraph 16.353 - "Fuel strainers in accordance with Drawing Nos AN4108, AN4109 and AN4145 shall be used."

Deviation: Fuel strainers or filters are not required. In lieu thereof, a #8 mesh screen may be installed in the fuel line near the engine to afford protection to the engine pumps.

Reason for Change and Remarks: To preclude excessive fuel pressure drop. Fuel strainers per Drawing No. AN4109 are of insufficient capacity.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

117 3.14.1 Instruments

Requirement: Paragraph 19.0 - "The instruments and instrument boards required shall be installed in accordance with Specification No. AN-I-2."

Deviation: Instruments and instrument boards required shall be installed in accordance with Specification No. MIL-I-5997, except as specified herein.

Reason for Change and Remarks: To establish the specification the Contractor proposed to use.

* * * *

118 3.14.3 Installation - Instruments

Requirement: Paragraph 19.00 - "A minimum clearance of 10 inches shall be provided behind the instrument board to accommodate the instruments and connections when installed."

"Unless otherwise specified, instruments shall be front-mounted; i.e., with the flange of the instrument on the face of the board instead of the rear."

Deviation: A minimum clearance of 6 inches shall be provided behind the instrument board, except at extreme outboard edges in area of "V" type windshield structure. Instruments shall be backmounted.

Reason for Change and Remarks: The configuration of the instrument panel and the space limitations of the cockpit will not allow 10 inches clearance behind the instrument board. The use of sandwich-type panel lighting necessitates the back mounting of instruments.

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5 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AMC Manual 80-1 (Cont)**

119 3.14.3 Installation - Instruments

Requirement: Paragraph 19.04 - "The instruments shall be arranged substantially in accordance with the applicable figure on Drawing No. AD3001."

Deviation: The instruments shall be arranged substantially in accordance with the applicable figure on Drawing No. AD3001, except as approved by Mock-Up Board Meeting on 28 and 29 September 1954.

Reason for Change and Remarks: Space limitations and the prime consideration of the pilot's display of the fire control system.

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120 3.14.3 Installation - Instruments

Requirement: Paragraph 19.161 - Remote Compass - "Installation shall be made in accordance with applicable specification .... "

"Type J-2 magnetic remote slaved gyro compass Specification No. 21181."

Deviation: Installation of Type J-2 magnetic remote slaved gyro compass shall be in accordance with Specification No. MIL-C-6588.

Reason for Change and Remarks: To comply with latest specification. (Reference Convair letter 6-1851 dated 29 April 1954.)

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
121	3.14.1	Instruments

Requirement: Paragraph 19.19 - "All aircraft with anti-g equipment shall have an accelerometer in accordance with Drawing No. AN 5745."

Deviation: No accelerometer is required.

Reason for Change and Remarks: The accelerometer serves no useful purpose on this airplane.

* * * *

Deviation	Paragraph	AMC Manual 80-1 (Cont)
122	3.16.11.2	Signal Assemblies

Requirement: Paragraph 19.46 - The Type C-1 landing gear position indicator, Specification No. 21250, shall be installed in accordance with Specification No. 32300.

Deviation: The AN5839 landing gear position indicator, Specification No. MIL-I-6839 shall be installed in accordance with Specification No. MIL-E-7563 as deviated in this specification.

Reason for Change and Remarks: To specify applicable specifications.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
123	3.14.3	Installation - Instruments

Requirement: Page 19.4, Figure 19-3 - "Installation of directional gyro and gyro horizon."

Deviation: The specified instruments may not be installed in accordance with Figure 19.3.

Reason for Change and Remarks: The Contractor proposes to use small instruments to conserve space. The space limitations of the instrument panel makes it impracticable to comply with Figure 19-3.

* * * *

Deviation	Paragraph	
124	3.17.1.1	Control Console

Requirement: Paragraph 20.2 - "Space and mounting provisions shall be made for the original panels to be easily replaced by longer panels so that other panels may be added in case of a change in radio or radar requirements after completion of the airplane design. The extra space provided shall amount to 20% of that required for the installed controls."

Deviation: Twenty percent space of that required for the installed controls shall not be provided.

Reason for Change and Remarks: Due to quantity of equipment installed and to type of aircraft, there is insufficient space available to meet the above requirement.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
125	3.18	Armament

Requirement: Paragraph 21.111 - "This paragraph specifies armament, ground and air test per Specification No. 34014."

Deviation: Armament, ground and air testing per Convair Report ZM-8-109 in lieu of Specification No. 34014.

Reason for Change and Remarks: Specification No. 34014 is not applicable for testing missiles and FFAR.

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Deviation	Paragraph	AMC Manual 80-1 (Cont)
126	3.18.6	Passive Defense

Requirement: Paragraph 21.920 - "Protection shall be provided in all tactical AF aircraft for the crew and vital aircraft components against gunfire in accordance with the following general requirements."

Paragraph 21.921 - Fighter Aircraft - "This paragraph gives specific requirements for fighter aircraft armor.

Deviation: Passive defense shall not be provided.

Reason for Change and Remarks: Unnecessary weight. The low grazing angles of the fuselage forward of the pilot, plus the rugged radome and the mass of radar equipment forward of the pilot are considered to be ample protection.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
127	3.19.1.1	Safety Belt and Shoulder Harness

Requirement: Paragraph 23.110 - "All crew and passenger seats shall be equipped with a belt; aircraft safety, Type B-14."

Paragraph 23.111 - "All crew and passenger seats, except those permanently faced rearward, shall be provided with the belt, safety, shoulder harness, Type B-16."

Deviation: An automatic-opening lap-type safety belt and an adjustable safety shoulder harness, as specified in Appendix 1-A, shall be installed on each seat.

Reason for Change and Remarks: WADC specified above equipment for this airplane.

* * * *

128	3.16.7	Controls - Electrical

Requirement: Paragraph 23.14 - "Heated clothing rheostat, Type Q-1B, in accordance with Specification No. 94-32357, shall be installed at each crew station in all bombers and large aircraft of 15,000 pounds gross weight or larger .... "

Deviation: Heated clothing rheostat shall not be required. A rheostat and receptacle as approved by WADC shall be provided for electrical heating of partial pressure suit face plate.

Reason for Change and Remarks: Heated clothing not required in that the cockpit is air conditioned.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

129 3.19.2 Miscellaneous Equipment

Requirement: Paragraph 23.26 - "All aircraft shall be equipped with a baggage and tool locker or compartment appropriate to the crew and intended mission of the aircraft, etc."

Deviation: Baggage compartment or tool compartment shall not be required.

Reason for Change and Remarks: F-102A Mock-Up Board decision at nose section inspection held at Convair on 28 - 29 July 1954. RFA #66.

* * * *

130 3.19.1 Accommodations for Personnel - Smoking Facilities

Requirement: Paragraph 23.28 - Compartments where smoking is permitted shall be equipped with ash trays of the self-contained type which are completely removable, and where practicable, with electric lighters. All other compartments shall be placarded against smoking.

Deviation: No ash tray or electric lighter shall be provided. Compartment shall not be placarded against smoking.

Reason for Change and Remarks: F-102A approval by Nose Section Mock-Up Board Inspection on 28 - 29 July 1954. (Reference RFA #66) To maintain design identical to F-102A airplanes.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
131	3.19.2.2	Map and Data Case

Requirement: Paragraph 23.230 - Data Case - "To provide an aircraft data case, Dwg, No. 36G2873, shall be installed in all aircraft.

Paragraph 23 233 - Flight Report Holder "All aircraft shall be equipped with a flight report holder, Type ~~A-3~~, in accordance with Drawing 0161366."

Paragraph 23.234 - Map Case - "Aircraft having a cruising range over 600 miles shall be equipped with a map case at least 9 x 12 x 4 inches.

Deviation: A combination flight report holder, data and map case shall be provided, which dimensions shall be 9 x 12 x 3.75 inches.

Reason for Change and Remarks: Relatively short flight duration and large amount of electronic navigational aids installed, obviate need for separate flight report holder map and data cases. The combination case will be the size specified in Paragraph 23.234 except for thickness.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
132	3.2.2 3.11.5	Materials Firewalls

Requirement: Paragraph 24.00 - "Aircraft designers shall utilize materials and processes approved for USAF use, which are listed not only in the USAF Index of Specifications, and Bulletins Approved for USAF Procurement, but also in USAF Bulletin No. 23."

Deviation: (A) Components of the airframe as illustrated by the list below may be manufactured of metal honeycomb construction, metal-to-metal bonded construction, or glass fiber plastic honeycomb construction providing process specifications controlling the complete construction and inspection of the components are submitted for USAF approval and providing each primary structural application is submitted for USAF approval.

1. Wing Tip
2. Fin Tip
3. Rudder
4. Nose Wheel Door
5. Elevon Trailing Edge
6. RAT Door
7. Engine Intake Duct
8. Cockpit Side Panels
9. Access Doors
10. Wing Fences
11. Upper Access door – Intermediate electrnics comp.
12. Vertical Beam - Nose radar comp.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
132 (Cont)	3.11.5	Firewalls (Cont)

(B) The use of Inconel W alloy is permitted, subject to specific approval of each application by WADC.

(C) Structural and non-structural applications of titanium and titanium alloys in accordance with AMS-4900, AMS-4901, AMS-4908, AMS-4921, AMS-4925, USAF Specification Bulletin No. 108A and Convair Specification No. 0-01008 shall be permitted subject to individual application approval by WADC. Other titanium alloys may be used as WADC approval is granted.

(D) The use of 24S bare aluminum alloy, sheet and extrusion, solution heat treated and artificially aged shall be permitted and the design allowables shall be based on the recommended physical properties of ANC-5. and Convair Report ZS-205 revised 25 May 1954 titled "Mechanical Properties of Artificially Aged 24S Material."

Reason for Change and Remarks: (A) Permits higher production with lower cost and decreased weight.

(B) Inconel W is approved by AMC letter MCPPAF-6 (WCSF-6) RGA/met dated 6 November 1953.

(C) Due to optimum strength-weight ratio, considerable weight savings are made possible.

(D) The use of bare 24S aluminum alloys provides higher physical properties and a resulting weight saving. Verbal Approval was given by Materials Lab.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph AMC Manual 80-1 (Cont)

133 3.2.2. Materials

Requirement: Paragraph 24.122 - "Arc-welding electrodes conforming to Spec. AN-E-9. . . . . . . are preferred. . . . . "

Deviation: In addition, heat treatable welding electrodes as specified in Convair Specification 0-01004 may be used for structural application providing the design allowables of Convair report ZS-194 "Heat Treatable Welds in Steel Plate" are used.

Reason for Change and Remarks: To provide higher strength welds. Specs 0-01004 and ZS-194 were approved by AMC letters MCPPAF-6 (WCSF-6) RGA/met dated 23 September 1953 and MCPPAF-6 (WCSF-6) RGA/met dated 28 December 1953.

* * * *

134 3.2.2 Materials

Requirement: Paragraph 24.123 - "The joints shall be designed, fabricated, inspected and accepted in accordance with Spec AN-W-30. . . . . "

Deviation: Spot welding of commercially pure titanium sheet shall be permitted in accordance with Convair Spec. 0-05003.

Reason for Change and Remarks: Convair Spec 0-05003 was approved by AMC letter MCPPAF-6 (WCSF-6) RGA/feb dated 12 July 1954.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1 (Cont)
135	3.4	Structural Design Criteria

Requirement: Paragraph 25.1 - "Demonstration flights of aircraft shall be conducted in accordance with Specification No. R-1803-11."

Deviation: The requirements shall be as outlined in Contractor's Report No. ZU-8-021 "TF-102A Structural Integrity Flight Demonstration" which shall be subject to WADC approval. It shall be used in lieu of Specification No. R-1803-11 dated August 1, 1947.

Reason for Change and Remarks: To provide a specification specifically applicable to the configuration, speed, range and purpose of the aircraft.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1, Drawing AD1
136	3.19.2.1	Instrument Panel

Requirement: Sheet 3 of 3 - Landing gear position indicators shown immediately above Landing Gear Control Handle.

Deviation: Landing gear position indicators shall be located on the left side of the student's instrument panel.

Reason for Change and Remarks: (a) Location in agreement with ANA Bulletin #386.

(b) Location approved by F-102A Mock-Up Board of 28-29 July 1954. Ref RFA #37. To maintain design identical to F-102A airplanes.

* * * *

137	3.16.8.2	Interior Lights

Requirement: Sheet 3 of 3 - Lighting switches to be in RH console.

Deviation: Lighting switches shall be located on utility switch panel located below each instrument panel.

Reason for Change and Remarks: Location approved by F-102A Mock-Up Board of 28-29 July 1954, Ref RFA #14. To maintain design identical to F-102A airplanes.

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138	3.10.4.2	Pilot Assist System
	3.17.1.1	Control Panels

Requirement: Sheet 3 of 3 - Lighting, De-icing and Pitot heat controls shown on RH console.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AMC Manual 80-1, Drawing AD1 (Cont)
138 (Cont)	3.10.4.2	Pilot Assist System (Cont)
	3.17.1.1	Controls Panels (Cont)
	Deviation:	Data link and AFCS panels shall be located in center console in lieu of equipment shown above.

Reason for Change and Remarks: To maintain same relation to student as on F-102A.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-B-2a, dated 20 August 1947 - Brake System: Aircraft, Design of
139	3.8.2.2	Brakes

Requirement: Paragraph C-1: "This capacity shall normally consist of 100 stops at 10 feet per second per second deceleration at the design gross weight condition of the airplane or 0.9 times the maximum alternate weight, whichever is larger."

Deviation: The brakes shall be the same as those used on the F-102A airplane.

Reason for Change and Remarks: To use existing F-102A components wherever practicable.

* * * *

140	3.8.2.2	Brakes

Requirement: Paragraph D-4b and D-4e (4)a - Parking Locks

Deviation: Parking locks are not required.

Reason for Change and Remarks: F-102A Cockpit Mock-Up Board agreed that parking brakes were not required for F-102A. To maintain design identical to F-102A airplanes.

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15 OCT 1954

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification AN-B-4b (1) dated 7 September 1949, Bearings; Anti-Friction Air-Frame Ball
141	3.2.11.1	Bearings
	Requirement:	Paragraph D-1b(1)- " --- the closure shall be a composition contact seal which will operate satisfactorily at conditions specified in section F.
	Deviation:	Anti-friction bearings without fixed seals may be used in the secondary controls systems.

Reason for Change and Remarks: To save weight and simplify design, bearings of the Fafnir B500 series (unshielded) may be used. Removable stainless steel shields will be added at each application for retaining the lubricant.

* * * *

142	3.2.11.1	Bearings
	Requirement:	Paragraph D-6. Lubrication - "The bearings shall be packed with grease conforming to Specification AN-G-25.."
	Deviation:	Anti-friction bearings used in high temperature areas shall be packed with high temperature lubricant, Dow-Corning DC-44 or equivalent.

Reason for Change and Remarks: To provide high temperature lubricant in bearings required in the high temperature areas. (Deviation approved by AMC letter of 28 August 1953.)

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15 OCT 1954

CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 178 DATE 6-7-55

CHANGE NO. 1029 MODEL TF102A REVISED 30 September 1955

CONTRACT AF33(600)-23903, 29264

AUTHORITY AND REASON FOR CHANGE: CCN 6N-1107(#181), 6N-1108(#38), 6N-1109(#8) dtd 18 Aug. 1955
Convair requested - Stowage in airplane not desirable

PARAGRAPH NO.		CHANGE
	APPENDIX II	
Deviation No.	Paragraph No.	Air Force - Navy Aeronautical Spec. AN-J-5 (2)
144e	3.22.2	Jacking Provisions
	Requirement:	Paragraph E-4d "A canvas bag shall be provided for stowage of all removable jack pads and shall be clearly marked as follows:"
	Deviation:	Jack pads shall not be carried in the aircraft.

Reason for Change and Remarks: Baggage and/or tool compartment is not provided. The performance of an interceptor type fighter should not be reduced by carrying equipment nonessential to the completion of a combat mission

Effect on Weight:	-0.7 lbs.
Effect on Balance:	-343 in. lbs.
Effect on Performance	Negligible

AIRPLANES AFFECTED: 54-1351 and on

BY

APPROVED BY C. O.

FORM 618B-2

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Air Force-Navy Aeronautical Specification No. AN-J-5 (2), dated 26 November 1947 - Jack Pads; Design and Installation of (For Aircraft)
143	3.22.2	Jacking Provisions

Requirement: Paragraph E-1a (2) - "Aircraft having a gross weight between 19,000 and 100,000 pounds shall be provided with four jack pads on the wings or nacelles (two on each side)."

Deviation: Two jack pads shall be installed on the wing (one on each side).

Reason for Change and Remarks: Due to the short span of the wing it is not practical to use two jack pads on each side.

* * * *

Deviation	Paragraph	
144	3.22.2	Jacking Provisions

Requirement: Paragraph E-1c (2) - "Aircraft having a gross weight of 20,000 pounds or less shall be provided with one jack pad and aircraft having a gross weight of over 20,000 pounds shall be provided with two jack pads....."

Deviation: One jack pad only shall be required on the fuselage.

Reason for Change and Remarks: The configuration of the airplane is such that a second jack pad on the nose section would interfere with the operation of the nose gear and nose gear door. The airplane mock-up (TF-102A) was presented and approved with the single jack point on the fuselage.

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
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FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 179

DATE 15 February 1956

CHANGE (ECP) NO. 1127

MODEL TF-102A

REVISED 26 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested. Cataloging and Standarization Div. conference of 7-9 Feb. 1956. Convair Ltr. 6-7071 dtd 1-3-56. CCN #61 MSN 6N-2879 dtd 1-18-56, CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #4 MSN 6N-6174 dtd 5-10-56.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

	Deviation	Paragraph	AN-I-21A(2), dated 2 May 1947, Interchangeability and Replaceability of Component Parts for Airplanes.
DELETE:			
	*145	3.2.5	Interchangeability and Replaceability
		Requirement:	Specification No. AN-I-21A(2).
		Deviation:	The component parts of the airplane will be interchangeable or replaceable, as the case may be, as specified in Appendix IIIA which is in general accordance with Specification No. AN-I-21.

Reason for Change and Remarks: To establish the degree of interchangeability and replaceability. To maintain same interchangeability and replaceability requirements for parts common to F-102A airplanes and TF-102A airplanes.

* Effective on A/C Ser. Nos. AF54-1351 thru 56-2379.

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C - 2

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AN-I-21A (2), dated 2 May 1947, Interchangeability and Replaceability of Component Parts for Airplanes.
145	3.2.5	Interchangeability and Replaceability
	Requirement:	Specification No. AN-I-21A (2).
	Deviation:	The component parts of the airplane will be interchangeable or replaceable, as the case may be, as specified in Appendix IIIA which is in general accordance with Specification No. AN-I-21.

Reason for Change and Remarks: To establish the degree of interchangeability and replaceability. To maintain same interchangeability and replaceability requirements for parts common to F-102A airplanes and TF-102A airplanes.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. R-1800-E (5), dated 28 May 1945 - Aircraft, General Specification for
146	3.2.11.1	Bearings

Requirement: Paragraph D-3 - "..... Whenever AAF Standard utility parts cannot be used, the special parts shall be so fabricated that they will not be dimensionally interchangeable with AAF Standard utility parts and their appearance shall be readily distinguishable."

Deviation: Certain anti-friction bearings will be interchangeable dimensionally with other standard anti-friction bearings but will utilize high temperature lubricants and will be marked to indicate the high temperature usage.

Reason for Change and Remarks: Anti-friction bearings utilizing high temperature lubricants required in high temperature areas. (Deviation approved by AMC Ltr of 28 August 1953).

* * * *

Deviation	Paragraph	
147	4.1	Sampling Inspection and Test

Requirement: Paragraph D-15 - Magnetic Inspection: At least the following primary structural assemblies, if fabricated of ferrous materials, shall be magnetically inspected in accordance with Specification AN-I-32: etc.

Paragraph D-15a - Bolts: Bolts to be used in primary and other important assemblies and locations shall be magnetically inspected. The contractor shall furnish a list of these assemblies showing the location of all important bolts identified by AN part number if it is a standard bolt, and by the Contractor's part number if it is a special bolt.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. R-1800-E (5) (Cont)
147 (Cont)	4.1	Sampling Inspection and Test (Cont)
	Deviation:	Not applicable. Magnetic inspection shall be in accord-and with Specification No. MIL-I-6868.

Reason for Change and Remarks: These requirements have been restated in AN-I-39, MIL-I-6870 and MIL-I-6870A on succeeding dates and the existence of the old requirements are considered redundant and confusing. (Ref Convair Ltr 6-795 dated 26 Feb 1954).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B, dated 1 June 1948 - Stability and Control Characteristics for Airplanes
148	3.3.2.1	Stability and Control
	Requirement:	Paragraph 2.4 - "Vg indicated stalling speed, corrected for instrument and position error, at the gross weight corresponding to the specified condition."
	Deviation:	Vg shall be defined as that speed attainable with $C_L = 0.75$, corrected for instrument and position error, at the gross weight corresponding to the specified condition.

Reason for Change and Remarks: Since there is no definite stall point as on conventional aircraft, an arbitrary selection of lift coefficient is necessary.

* * * *

Deviation	Paragraph	
149	3.3.2.1	Stability and Control
	Requirement:	Paragraph 4.1 - "Dynamic Longitudinal Stability - The short period dynamic oscilliation of normal acceleration produced by moving and quickly releasing the elevator control shall be damped to 1/10 amplitude in one cycle."
	Deviation:	The specified number of cycles to damp may be exceeded provided that the oscillations are definitely stable and the degree of damping is satisfactory to WADC. If a device is used to provide the desired damping, it shall be required that no dangerous oscillations can occur under any circumstances without such damping device.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
149 (Cont)	3.3.2.1	Stability and Control (Cont)

Reason for Change and Remarks: As already demonstrated on the YF-102 in flight, it is not necessary to meet the specified damping from the flight safety standpoint. The pitch damper will normally be operative.

* * * *

150	3.3.2.1	Stability and Control

Requirement: Paragraph 4.2.1 - "The airplane shall posses positive static stick-fixed and stick-free longitudinal stability at all normal service loadings when flying with constant throttle setting under the conditions of Table II .... if the curve of the variation of stick force with air speed below the trim speed does not cross the zero force axis and a pull force is required to reduce the speed from trim."

Deviation: (a) Elevator-Fixed Static Stability-Applicable, except that at a Mach number above 0.85 with the airplane trimmed at a Mach Number of 0.85, the variation of elevator deflection with Mach number may be negative, provided it is mild and not seriously objectionable to the pilot.

(b) Elevator-Free Static Stability - When trimmed under the conditions specified in Table II the variation of longitudinal control force with speed shall be a smooth curve with a stable gradient over a speed range of 50 knots (true speed) above and below trim. If a reversal in slope occurs above or below this speed range the change of control force with speed shall be mild and not seriously objectionable to the pilot.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
150 (Cont)	3.3.2.1	Stability and Control (Cont)

Reason for Change and Remarks: (a) A mild instability of elevator angle will occur at transonic speeds which is caused by an aft movement of the center of pressure with constant or decreasing control effectiveness. This effect is considered not to be a hinderance to the flying qualities because the variation of longitudinal control force with speed shall be a smooth stable curve.

(b) The original specification requirements are not applicable to an airplane flying through the transonic speed range with a power control system.

* * * *

151 3.3.2.1 Stability and Control

Requirement: Paragraph 4.3.2 - "When the airplane is trimmed at any permissible speed, it shall be possible by use of the elevator alone to develop, at the trim speed, the maximum positive or negative lift coefficient or positive or negative limit load factor, whichever is reached first. This requirement shall apply to all of the configurations listed in Paragraph 2.2 with the exception of configuration WO."

Deviation: Applicable, except as limited by angle of attack corresponding to a $C_L = 0.75$ at stall speed, maximum available elevator deflection or maximum limit load factor. The stalling speed used for performance estimates or guarantees (if any) shall be consistent with this definition.

Reason for Change and Remarks: An arbitrary angle of attack has to be selected and elevator control power be made consistent with an optimum power control system in order that undue weight penalties do not occur.

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15 OCT 1954

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
152	3.3.2.1	Stability and Control

Requirement: Paragraph 5.1.1 - "The damping of the lateral-directional oscillation with controls fixed and free shall be positive and shall be such that the time to damp to one-half amplitude and the period shall fall within the satisfactory area of the chart given in Figure 1."

Deviation: Artificial damping devices may be used to meet the requirements of R-1815B.

Reason for Change and Remarks: Artificial damping devices will be required to meet the requirements of R-1815B.

* * * *

Deviation	Paragraph	
153	3.3.2.1	Stability and Control

Requirement: Paragraph 6.3.4 - "In rolls from straight or turning flight under the specified conditions at 10,000 feet altitude, with the rudder held fixed in the position required for steady flight prior to the roll, the ailerons or other lateral control device shall be sufficiently powerful to produce the peak rolling rates corresponding to the values given in Table V."

Deviation: Available roll rates shall be subject to approval by WADC.

Reason for Change and Remarks: Additional investigations are required to establish the roll rates.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
154	3.3.2.1	Stability and Control

Requirement: Paragraph 7.1.1 - "The complete stall is considered to be the condition associated with breakdown of the airflow over the wing, and occurring immediately after the overall trimmed lift coefficient of the airplane reaches its maximum value, except that this maximum shall not be set by limitations of available longitudinal control power. The complete stall is generally characterized by the following changes in the flying characteristics of the airplane:

(a) In straight flight, the airplane experiences one or more of the following: An abrupt downward pitching of the nose, or an abrupt dropping of the wing and the air speed reaches a minimum.

(b) In turning flight, the normal acceleration decreases markedly or the airplane rolls markedly."

Deviation: For purposes of stalling characteristics demonstration only, the stall shall be considered to be identified by full up elevator deflection.

Reason for Change and Remarks: There is no definite stall point as on conventional aircraft.

* * * *

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
155	3.3.2.1	Stability and Control

Requirement: Paragraph 8.1.1 - "The control system should be capable of moving the control surfaces at rates up to 35

1-5 OCT 1956

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

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SPEC. NO ZD-8-004A

FILE OPP. PG. NO. 187 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Specification Correction, see note at bottom of page. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

PARAGRAPH NO. CHANGE

APPENDIX II

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
155 (Cont)	3.3.2.1	Stability and Control (Cont)

Change Second sentence of Deviation to read:

> "In order that this condition be fulfilled, it is required that the rates of control surface deflection be such that the angular response velocity of the airplane for a given surface displacement, under any flight condition, shall reach and remain with in +10% of the final (short period) value in a time not more than 10% greater than the time associated with an assumed instantaneous control surface displacement of the same given value."

(NOTE: That portion of the above sentence which is under lined was erroneously omitted in typing specification ZD-8-004A, and is being added by this change.)

AIRPLANES AFFECTED: AF54-1351 and Subsequent.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1815B (Cont)
155 (Cont)	3.3.2.1	Stability and Control (Cont)

degrees per second for Class I and II airplanes and 50 degrees per second for Class III and IV airplanes under any aerodynamic hinge moments encountered."

Deviation: The ability of the airplane to perform the maneuvers expected of it shall not be limited significantly by the rates of the control surface deflection. In order that this condition be fulfilled, it is required that the rates of control surface displacement, under any flight condition, shall reach and remain within +10% of the final (short period) value in a time not more than 10% greater than the time associated with an assumed instantaneous control surface displacement of the same given value.

Reason for Change and Remarks: This deviation is consistent with design and weight penalties.

* * * *

156 3.3.2.1 Stability and Control

Requirement: Paragraph 8.1.2 - "When the cockpit control is moved at its maximum rate to a given deflection, the control surface shall reach its corresponding deflection with a time lag not greater than 0.05 second."

Deviation: The equivalent first order time constant for the power control system shall be no greater than 0.1 sec.

Reason for Change and Remarks: Lags not compatible with specification requirements for the slower surface rates will be sufficiently small that the control characteristics will be satisfactory.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation1 Paragraph AAF Specification No. 1815B (Cont)

157 3.10.1 Primary Flight Control System

Requirement: Paragraph 8.1.3 - "The dead spots in the controls should not exceed ±0.1 inch motion of the pilot's cockpit controls.

Deviation: The dead spots in the controls shall not exceed ±0.2 inch motion of the pilot's cockpit controls.

Reason for Change and Remarks: The function design requirements of the airplane will not permit a simplified routing of the system to meet this requirement.

* * * *

158 3.3.2.1 Stability and Control

Requirement: Paragraph 8.4.1 - "For airplanes having two or more completely independent equivalent power control systems, the requirements of Paragraph 8.3.1 shall be met during the period of transfer from one system to another. Paragraphs 8.3.2, 8.3.3, and 8.3.4 do not apply to these airplanes."

Deviation: Applicable except that each system shall be capable of providing approximately half of the design hinge moment. Both systems shall be in operation under normal conditions.

Reason for Change and Remarks: To enable use of independent dual systems.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 1816, dated 15 June 1945 - Spinning Requirements for Airplanes -
159	3.3	Aerodynamics

Requirement: Paragraph B-1 - "This specification covers the spinning requirements of airplanes."

Deviation: The requirements of this specification shall be applicable to this airplane if it can be shown that spins may be encountered.

Reason for Change and Remarks: Available data indicate that the airplane may be spinproof.

* * * *

Deviation	Paragraph	
160	3.3	Aerodynamics

Requirement: Paragraph D-3a - References Paragraph D-2a which specifies "a one-hour spin test flight."

Deviation: One-half hour spin test flight.

Reason for Change and Remarks: To conform with airplane endurance and the intent of the specification.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AF Specification No. 40149, dated 2 September 1947, Check List; Air Crew Operation
161	3.19.2.3	Check List

Requirement: Paragraph E-1b(2)a - "The material with which the content is printed on the plate shall be a phosphorescent substance having a peak brightness of at least 100 microlamberts when measured in accordance with provisions of Specification No. AN-L-1. It shall have a phosphorescent value of at least 15% of its peak brightness 30 seconds after removal from the source of excitation and at least 3% of its peak brightness 2 minutes after its removal from the source of excitation."

Deviation: The check-off list shall be illuminated according to Specification No. MIL-P-7788.

Reason for Change and Remarks: For uniformity and ease of servicing, all lighting in the cockpit is red light. There is no ultraviolet light provision in the cockpit.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C dated 15 December 1947, Anti-Icing Equipment for Aircraft (heated Surface Type,) General Specifications for
162	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-1e. - "Antenna masts, pitot tubes, radar vanes and airfoils, and other structures of similar nature which project into the air stream so as to be exposed to and adversely affected by ice accumulations shall be protected by the anti-icing system."

Deviation: Applicable, except that the radome will be protected by a freezing point suppressant liquid spray,

Reason for Change and Remarks: Freezing point suppressant liquid spray system recommended by WADC Components System Laboratory.

* * * *

Deviation	Paragraph	
163	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-2a. - "The anti-icing system shall provide protection against an icing condition ...... and wherein the size of the water droplets is not less than 15 microns in diameter."

Deviation: The anti-icing system shall provide protection against an icing condition...... and wherein, the mean effective cloud droplet diameter is not less than 15 microns.

Reason for Change and Remarks: The accepted method of designing for the protection of aircraft against ice is based on a mean effective cloud droplet diameter rather than a minimum diameter.

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13 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
164	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-3. - "No aircraft structural members shall be heated to more than 200°F."

Deviation: It shall be permissible for aircraft structural members to be heated to more than 200°F.

Reason for Change and Remarks: Allowance for strength reduction due to high temperatures will be made. To maintain the design identical to F-102A airplane.

* * * *

Deviation	Paragraph	AAF Specification No. 40395-C (Cont)
165	3.20.2.1	Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-5. - "The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than five degrees Fahrenheit after two hours of operation."

Deviation: The operation of the anti-icing system under any condition of flight shall not raise the temperature of the fuel in any portion of the fuel system more than 5°F during the length of time that the anti-icing system may be in operation.

Reason for Change and Remarks: The flight time under icing conditions will be much less than two hours.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **AAF Specification No. 40395-C (Cont)**

166 3.20.2.1 Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-8a. - "The anti-icing system shall be capable of distributing heat to remove frost and ice from the wing and empennage surfaces when the airplane is at rest on the ground at all ambient temperatures down to -65°F.

Deviation: Not applicable.

Reason for Change and Remarks: Wing and empennage surfaces have anti-icing space and structural provisions only. To maintain the design identical to F-102A airplane.

* * * *

167 3.20.2.1 Anti-Icing of Nontransparent Areas

Requirement: Paragraph D-9. -"The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, dated 9 January 1946."

Deviation: The heat requirements shall be calculated in accordance with the methods outlined in AAF Technical Report No. 4972, Addendum 1, Dated 9 January 1946, or other authoritative literature.

Reason for Change and Remarks: There is authoritative literature which is more up to date and more realistic with respect to predicting water catch, water load profiles, and heat requirements. To maintain the design identical to F-102A airplane.

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15 JUL 1954

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SPECIFICATION CHANGE NOTICE
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SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 194 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT. AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor requested change - Ref. Convair Ltr 6-2142 dtd 4-28-55 and AMC approval Ltr MCPHFC(WCSFG)1-6 RGA/jem dtd 6-9-55. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

APPENDIX II - Spec. MIL-I-5072

ADD: Deviation 167a

167a 3.14.3 Instrument Installation

Requirement: Paragraph 3.5.3 - ".....not more than six instruments consisting of a combination of altimeters, airspeed indicators, rate-of-climb indicators and the equivalent in other pitot-static pressure operated equipment shall be connected to any one pitot-static tube....."

Deviation: It shall be permissible to connect more than six instruments to any one pitot-static tube. Each installation shall be submitted to WADC for approval.

Reason for Change and Remarks: There is no suitable place for the installation of an additional pitot-static tube. Analysis has shown that increased lag due to the additional indicators was negligible.

AIRPLANES AFFECTED: All

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SPECIFICATION CHANGE NOTICE

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SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 194 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-29264, -23903 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor requested change, Ref. Convair Ltr 6-2142, dtd 4-28-55 & AMC approval Ltr MCPHFC(WCSFG)1-6 RGA/jem dtd 6-9-55. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

APPENDIX II - Spec. MIL-I-5072

Deviation 168 - Change "Deviation" and "Reason" to read as follows:

Deviation: Pitot and static pressure lines in the radome area may be 1/4" and/or 3/8" outside diameter and 0.035 inch wall thickness and may be nylon. (Polymer Corp. #FM 10,000 or equivalent) as approved by WADC, prior to installation.

Reason for Change and Remarks: To eliminate electronic radar interference by the installation of suitable nonmetalic lines in the radome area and lag in the static pressure line.

AIRPLANES AFFECTED: All

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Spec. No. MIL-I-5072, dated 6 April 1949 - Instrument Systems; Pitot Static Tube Operated, Installation of
168	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.6 - Connecting Lines - "The pitot and static pressure lines connecting the pitot and static tubes to the instruments shall conform to Spec. WW-T-787, anodized in accordance with Spec. AN-QQ-A-696, and shall be 1/4 inch outside diameter and 0.032 inch wall thickness."

Deviation: Pitot and static pressure lines in the radome area shall be 1/4 inch outside diameter and 0.035 inch wall thickness and shall be nylon, (Polymer Corp #FM 10,000 or equiv.) as approved by WADC, prior to installation.

Reason for Change and Remarks: To eliminate electronic radar interference by the installation of suitable nonmetallic lines in the radome area. To maintain the design identical to F-102A airplane.

* * * *

169	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.7 - Connecting Fittings - "Connecting fittings used throughout the installation of pitot-static instrument systems shall conform to Air Force-Navy Aeronautical Standards."

Deviation: Quick disconnect type fittings may be installed in lines to facilitate removal of quick detachable radome.

Reason for Change and Remarks: To comply with requirements of Hughes Aircraft Corporation specification covering fire control system of quick disconnect radome.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Spec. MIL-I-5072 (Cont)
170	3.14.3	Instrument Installation

Requirement: Paragraph 3.3.15 - "When specified, an alternate source of static pressure for each pitot-static tube shall be provided by installing a static pressure selector valve conforming to Drawing AN5831 . . ."

Deviation: An alternate source of static pressure shall not be required. To maintain the design identical to F-102A airplane.

Reason for Change and Remarks: It is anticipated that special means with respect to static sources will have to be taken to meet the requirements for instrumentation and fire control equipment. The Contractor proposes to satisfy these particular requirements.

* * * *

171	3.14.3	Instrument Installation

Requirement: Paragraph 4.3.3.4.3 - "The air speed and altitude indication errors due to the location of the pitot-static tube, corrected to standard sea level conditions, shall not exceed the limits specified in Table I when tested in flight."

Deviation: In the transonic and supersonic speeds the Contractor will attempt to obtain the maximum accuracy possible using latest techniques.

Reason for Change and Remarks: The available equipment is not expected to yield the specified accuracies at transonic speeds.

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15 OCT 1954

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-W-5088, dated 14 March 1951 Wiring; Aircraft, Installation of
172	3.16.5	Wiring

Requirement: Paragraph 3.2.2.1 - "Insulating tubing for temperatures less than 93.3°C (200°F) shall conform to Specification JAN-I-631."

Deviation: It shall be permissible to use nylon insulating tubing. Where temperature of 93.3°C (200°F) is exceeded only during high speed operation, high temperature sleeving shall not be required.

Reason for Change and Remarks: Nylon insulating tubing is more suitable for use on this airplane since it will withstand Pratt and Whitney Engine Oil (Specification 521A) which is known to be detrimental to vinyl tubing, and has much better abrasive characteristics. Short duration of high temperature operation does not warrant the additional weight and cost. High temperature insulating tubing will be used wherever there is any possibility of damage due to excessive temperature.

* * * *

Deviation	Paragraph	
173	3.16.5	Wiring

Requirement: Paragraph 3.5.1.1 - For applications under 600V, cables shall be in accordance with Spec MIL-W-5086, MIL-W-7072, and MIL-C-7078. When specified by the procuring service cables in accordance with MIL-W-5274 (USAF) shall be used.

Deviation: (1) In addition to the above, cable in accordance with MIL-W-5274 (USAF) may be used for wire sizes AN-12 and smaller. For wire sizes AN-10 and larger cable in accordance with CVAC Spec. ZM-340-012 may be used.

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APPENDIX II

DEVIATION FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
173 (Cont)	3.16.5	Wiring (Cont)

(2) Special cable may be used subject to the approval of the procuring agency.

Reason for Change and Remarks: (1) Use of MIL-W-5274 (USAF) cable was requested by WADC - Cable in accordance with ZM-340-012 meets the requirements of MIL-W-5274 (USAF) for larger sizes not specified therein.

(2) To permit this contractor to use cable best suited for particular application.

* * * *

174	3.16.5	Wiring

Requirement: Paragraph 3.5.1.3 - "In areas where the cable temperature exceeds 100°C (212°F), cables specifically approved for high temperature use shall be installed."

Deviation: Where a temperature of 100°C (212°F) is exceeded only during high speed operation, high temperature wire shall not be required. High temperature wire shall be used where temperatures exceed 250°F for periods of 5 minutes or longer.

Reason for Change and Remarks: Short duration of high temperature operation does not warrant the additional weight and cost. High temperature wire will be used wherever there is any possibility of damage due to excessive temperature.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
175	3.16.5	Wiring

Requirement: Paragraph 3.5.1.4 - Coaxial cables suitable for the application shall conform to Specification JAN-C-17.

Deviation: Coaxial cable need not conform to JAN-C-17 but shall be approved by the procuring agency.

Reason for Change and Remarks: To use the coaxial cable best suited to the application and to take advantage of the reduced weight of newer coaxial cable.

* * * *

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
176	3.17 3.16.5	Electronics Wiring

Requirement: Paragraph 3.5.2.3 "When approved by the procuring service, cable size AN-22 may be used, provided that precautions are taken to prevent failure due to vibration and handling.

Deviation: Cable size AN-22 may be used for all inter-unit and inter-area electrical and electronic wiring where current carrying capacity and strength do not dictate use of larger conductor sizes.

Reason for Change and Remarks: Due to the large number of wires required and limited space available in the aircraft, a substantial improvement in size and weight of harness may be realized by substitution of the AN-22 cable for larger cables wherever possible.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   MIL Spec MIL-W-5088 (Cont)

177   3.16.5   Wiring

Requirement: Paragraph 3.6.1.1 - Exposed Junctions - Exposed junctions and buses shall be protected with insulating materials. Junctions and buses located within enclosed areas containing only electrical and electronic equipment are not considered exposed.

Deviation: Covers over electrical and radio equipment (Terminal strips etc.) shall not be required in locations where structure provides sufficient protection.

Reason for Change and Remarks: Covers not considered required where structure provides sufficient protection. This will result in a considerable weight saving in the airplane.

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178   2.16.5   Wiring

Requirement: Paragraph 3.6.6.1 - "Connectors in engine nacelles, areas of high vibration (excluding those on shock-mounted equipment) and in locations not readily available for inspection in flight shall have the coupling nut safety-wired to prevent opening of the connector due to vibration.

Deviation: "UG" type connectors in particular, and other bayonet type connectors with no threaded coupling nut, subject to approval of the procuring service need not be safety wired.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** MIL-Spec MIL-W-5088 (Cont)

178 Reason for Change and Remarks: Bayonet type connectors have a locking notch and once properly connected are not subject to opening due to vibration. These connectors are designed to the requirements of MIL-C-3608 which does not provide for safety wiring.

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179 3.16.10.2 Electrical Connectors

Requirement: Paragraph 3.6.6.4 - "Connectors for general aircraft wiring shall be in accordance with Specification No. MIL-C-5015."

Deviation: (1) Plugs suitable for potting designed in general accordance with BuAer drawing 54A3A225 (except that resilient inserts shall be specified) and receptacles meeting the same requirements except designed in accordance with AN-3100 or AN-3102 may be used in areas where the ambient temperature does not exceed 225°F.

(2) A minimum number of other nonapproved type connectors may be used where necessary, subject to the approval of the Procuring Agency.

Reason for Change and Remarks: (1) To insure a more environment free installation and to reduce weight.

(2) To permit the contractor to make use of the best possible design from servicing and weight standpoint. To maintain design identical to F-102A airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec MIL-W-5088 (Cont)
180	3.16.5	Wiring

Requirement: Paragraph 3.6.6.4.1 Transparent insulating tubing or other approved material shall be placed over each cable terminal connection in both plugs and receptacles.

Deviation: Insulating tubing shall not be required when either "potted" or "E" type connectors are used.

Reason for Change and Remarks: This requirement is not applicable when potted or "E" type connectors are used.

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Deviation	Paragraph	MIL-Spec MIL-W-5088 (Cont)
181	3.16.5	Wiring

Requirment: Paragraph 3.6.6.4.2 Adaptors 1 "Open wiring attached to connectors shall be supported by AN3057 Adapters and AN3420 Bushings or to an assembly consisting of a maximum length of six inches of insulating tubing, a set of approved ferrules, etc."

Deviation: (1) It shall be permissible to use Coast Pro-Seal Mfg. Div. No. E.P. 601-P compound or Minn. Mining No. E.C. No. 1120 P.C. compound as a "fill" and support in lieu of clamps or adaptors where the Contractor deems it practicable.

(2) Where adapters are used it shall be permissible to use bushings designed to AN3420A except that the material shall be suitable for use in areas subject to pollution by engine oil.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec MIL-W-5088 (Cont)
181 (Cont)	3.16.5	Wiring (Cont)

Reason for Change and Remarks: (1) Potting compound provides a more suitable method of sealing connectors against moisture and foreign particles. Also, it is a large weight savings.

(2) The material specified for AN3420A bushings is not suitable for use where it may be subjected to contamination by MIL-L-7808, P and W engine oil No. 521A.

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182 3.16.5 Wiring

Requirement: Paragraph 3.6.6.4.3 - "Special purpose connectors - Where installation conditions require pressurized sealed, vibration-resistant, flame-barrier, fireproof, or waterproof connectors, suitable special purpose connectors in accordance with Specification No. MIL-C-5015 shall be used."

Deviation: A minimum number of nonapproved type connectors may be used where necessary, subject to the approval of the procuring agency.

Reason for Change and Remarks: This will permit the Contractor to make the best possible design from servicing standpoint. To maintain design identical to F-102A airplane.

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183 3.16.10.2 Electrical Connectors

Requirement: Paragraph 3.6.6.5 - Connectors for coaxial cables shall be in accordance with Spec JAN-C-71.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation   Paragraph   MIL-Spec MIL-W-5088 (Cont)

183   Deviation: Connectors for coaxial cable shall be suitable for use with the coaxial cable used and shall be approved by the procuring service.

Reason for Change and Remarks: Connectors in accordance with Spec JAN-C-71 are for use with coaxial cable in accordance with JAN-C-17. Since other types of coaxial cable will be used suitable connectors must be permitted.

* * * *

184   3.16.5   Wiring

Requirement: Paragraph 3.6.7 - Splices shall be covered with transparent insulating tubing extending at least 1/2 inch over each end, providing it is a snug fit, and it will be secured in place. Splices shall be staggered to prevent shorts due to puncturing the insulation and to prevent excessive enlargement of the bundles.

Deviation: The above requirement will be complied with where disconnect splices are used. Where preinsulated permanent splices are used the sleeving may be omitted. The installation with respect to sleeving and staggering shall be subject to approval of the CTCI Board.

Reason for Change and Remarks: Sleeving and staggering are not necessary where nylon preinsulated permanent splices are used.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **MIL-Spec MIL-W-5088** (Cont)

185 3.16.5 Wiring

Requirement: 3.6.7.1 - Permanent splices shall not be used for salvaging short lengths of cable.

Deviation: It shall be permissible to connect potted connectors by means of permanent splices.

Reason for Change and Remarks: To facilitate fabrication and to provide for use of spare conductors where used in potted connectors.

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186 3.16.5 Wiring

Requirement: Paragraph 3.7.3 - "Cable groups shall contain no more than 26 cables, except as provided in Paragraph 3.7.3.2."

Deviation: It shall be permissible to install cable groups with more than 26 cables, provided, however, that such cable groups shall be kept to a minimum and shall be used only where such cable groups are required to go through congested areas.

Reason for Change and Remarks: The size of the airplane and the large number of cables required make it impossible to meet this requirement in all cases. To maintain design identical to F-102A airplane.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph MIL Spec MIL-W-5088 (Cont)

187 3.16.5 Wiring

Requirement: Paragraph 3.7.3.2 - Connectors - Wiring to connectors having more than 26 terminals may be run as single group provided all the wiring is pertinent to a single item of equipment.

Deviation: It shall be permissible to install more than 26 wires in a single connector not pertaining to a single item of equipment.

Reason for Change and Remarks: The size of the airplane and the large number of wires make it impossible to meet this requirement in all cases, and will permit the contractor to make the best possible design from the servicing standpoint.

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188 3.16.5 Wiring

Requirement: Paragraph 3.7.3.3 - Equipment - Cable groups containing more than 15 cables which pertain to a single item of equipment shall be separated from other cable groups.

Deviation: It shall be permissible to install cable group with more than 15 cables pertaining to single item of equipment with other cable groups, however, such cable groups shall be held to a minimum.

Reason for Change and Remarks: The size of the airplane and the large number of cables to be installed make it impossible to meet this requirement in all cases.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
189	3.16.5	Wiring

Requirement: Paragraph .3.7.3.4 --Cables of the primary electrical power system shall not be bundled or grouped with distribution circuit cables. Cables for each power source shall not be in the same bundle or group to prevent damage affecting more than one power source.

Deviation: It shall be permissible to deviate from the above requirements in areas which are so congested as to prevent compliance. Such installations shall be kept to an absolute minimum and approved by WADC.

Reason for Change and Remarks: The size of the airplane and the large number of cables to be installed make it impossible to meet this requirement in all cases.

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190	3.16.5	Wiring

Requirement: Paragraph 3.7.3.5 - Essential Equipment - Cables to each equipment which must operate to maintain flight of the aircraft under normal or emergency conditions shall be separately routed from other cables.

Deviation: Not applicable.

Reason for Change and Remarks: The contractor considers there are no circuits that are classified as essential for maintaining normal or emergency flight of this aircraft.

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

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SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 207 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor request - Ref Convair Ltr 6-3332 dtd 5-29-55. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

PARAGRAPH NO. CHANGE

APPENDIX II - Spec. MIL-W-5088

Deviation 191 - Change to read:

Deviation: (1) It shall be possible to put a maximum of four shields into a common terminal which will prevent removal of indivisual wires.

(2) The wave guide and cables in the vertical fin may be clipped together for ease of installation and removal.

Reason for Change and Remarks:

(1) Use of individual terminals for each shield would require the addition of a considerable number of terminals and grounds.

(2) Because of restricted accessibility, the wave guide and cables in the vertical fin have been clipped together for ease of installation and removal. Only through the use of additional access doors could the cables and wave guide be clipped separately and this would impose a serious weight penalty. (F-102A CTCI Board of 25-27 May 1955 recommended deviation.)

AIRPLANES AFFECTED: All

BY

APPROVED BY

FORM 8188-2

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
191	3.16.5	Wiring

Requirement: Paragraph 3.7.3.7 - Inspection and Maintenance - As a design objective, cable groups shall be installed to permit replacement of individual cables without removal of the group and to permit replacement of the group without removal of the bundle.

Deviation: It shall be permissible to put a maximum of four shields into a common terminal which will prevent removal of individual wires.

Reason for Change and Remarks: Use of individual terminals for each shield would require the addition of a considerable number of terminals and grounds.

* * * *

192	3.16.5	Wiring

Requirement: Paragraph 3.7.3.7.2 - Cable groups shall be installed in the form of quickly removable and replaceable harnesses, attachable and detachable from the adjacent harnesses and so located and supported to the structure that maintenance time is reduced to a minimum. As an installation objective, harnesses for a given installation shall be interchangeable in all models of the same series of aircraft. This installation may be accomplished by the use of disconnect splices, AN connectors, terminal blocks or other approved means acceptable to the procuring service.

Deviation: Harnesses may be installed in the airplane and connected by means of permanent splices as authorized in paragraph

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Mil Spec MIL-W-5088 (Cont)
192 (Cont)	3.16.5	Wiring (Cont)

3.6.7.1. Where this procedure prevents the removal of complete harnesses the requirements of this paragraph shall be waived.

Reason for Change and Remarks: Use of disconnect splices may be impractical and a substantial weight saving will be achieved by eliminating other types of disconnects, which would be necessary to meet these requirements.

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193 3.16.5 Wiring

Requirement: Paragraph 3.7.4.3 - Where cables are dressed downward to a connector.....a trap or drip loop shall be provided to prevent fluids or condensate from running into above devices.

Deviation: Drip loops shall not be required with "potted" or "E" type connectors.

Reason for Change and Remarks: These connectors are waterproof and the requirement is not applicable.

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194 3.16.5 Wiring

Requirement: Paragraph 3.8.1 Support Devices - Devices used for supporting cable shall be of an approved type which are

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | MIL-Spec MIL-W-5088 (Cont)

194 (Cont) | 3.16.5 | Wiring (Cont)

replaceable by AN 742 cushion clamp, AN 931 grommets, MIL-T-6841 tape, MIL-C-5649 cord, or other approved devices.

Deviation: It shall be permissible to use nylon cable clamps, grommets, tape and cord, where wire in accordance with MIL-W-5274 or MIL-W-5086 or special application wires which are otherwise approved by AMC are used.

Reason for Change and Remarks: Nylon cable clamps, grommets, tape and cord is more suitable for use on this airplane since it will withstand Pratt & Whitney engine oil (Specification 521A MIL-C-7808) which is known to be detrimental to vinyl and rubber, also it has better abrasive characteristics. Nylon clamps are considerably lighter than AN 742 cushion clamps. (Ref AMC MCPPAF-6 (WCSF-6) AGA/ch dated 24 August 1953).

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195 | 3.16.5 | Wiring

Requirement: Paragraph 3.10.1.2 - Flexible - Flexible metallic conduit conforming to Specification MIL-C-6136 shall be used only when the use of rigid metallic conduit is impracticable.

Deviation: It shall be permissible to install extra flexible conduit on the armament displacing gear. Conduit shall be approved by WADC.

Reason for Change and Remarks: Standard circuit is not suitable for use in this application.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
196	3.16.5	Wiring

Requirement: Paragraph 3.11.1.2 - "Master diagrams shall be substantially in accordance with Drawing No. 45L6937, and may be on multiple sheets or in book form in accordance with Specification No. MIL-H-5473."

Deviation: Master diagrams shall be on individual sheets in accordance with Specification No. MIL-H-5473, except that no internal diagrams shall be required.

Reason for Change and Remarks: Internal diagrams will be included on the schematics and to include them on the circuit diagrams would be a duplication adding unnecessary work.

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Deviation	Paragraph	MIL Spec MIL-W-5088 (Cont)
197	3.16.5	Wiring

Requirement: Paragraph 3.11.2 - "Practical diagrams - For all Air Force requirement, and when required by the Navy, practical wiring diagrams shall be placed on junction box covers or adjacent to junction centers, etc."

Deviation: Practical wiring diagrams will not be installed in the aircraft.

Reason for Change and Remarks: As adequate space is not available in desired locations, stowage of the prints in a less desirable location would be unsatisfactory due to damage caused by fluids and heat. As approximately 140 diagrams are required a considerable weight savings will result from this deletion. Circuit wiring and schematic diagrams will be contained in the airplane erection and maintenance manual.

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SPECIFICATION CHANGE NOTICE

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SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 211 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264 & 31174

AUTHORITY AND REASON FOR CHANGE: Contractor request - Ref. Convair Ltr C-333 dtd 29 June 1955. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033 (24) CCN #6N-3034(2).

PARAGRAPH NO.	CHANGE

APPENDIX II - Spec MIL-H-5440

ADD: Deviation 198a

198a 3.15.1.1 Hydraulic System

Requirement: Paragraph 3.8.2.1 - "..... a permanent pressure gage shall be attached to the air side of the accumulator. AN standard hydraulic gage shall be used, ...)

Deviation: Gages other than AN standard may be used, subject to WADC approval.

Reason for Change and Remarks: It is not the purpose of these gages to give a precise reading, but only to serve as an approximate visual check on the pressure condition of the system. Therefore, gages have been selected in preference to AN gages because of their light weight simplicity and more rugged construction. (Deviation recommended by CTCI Board of 25-27 May 1955.)

AIRPLANES AFFECTED: All

BY

APPROVED BY

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-H-5440, dated 9, June 1950-Hydraulic Systems; Design, Installation and Test of Aircraft
198	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.5.4 - "Disengagement and By-Passing - Provisions shall be made in the design of power-boosted and power-operated surface control systems for disengaging the actuator in the event of failure or jamming of the actuator, control valve or connecting linkages. Provisions need not be made for re-engaging in flight. Provisions shall be made for automatically by-passing, where necessary, the fluid from one side of the actuator to the other in the event of a power system failure. In addition, provisions shall also be made for temporarily by-passing the fluid from one side of the actuator to the other during periods when it is desired to operate surface controls manually with the hydraulic pressure turned off and the actuator disengaged."

Deviation: Disengagement and by-passing will not be required.

Reason for Change and Remarks: This is not considered applicable to a full-power control system.

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199	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.14 - "Gages - Pressure gages in accordance with the applicable specifications listed in Section 2 shall be provided to indicate the system pressure in the hydraulic system or subsystems where necessary."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Spec MIL-H-5440 (Cont)
199 (Cont)	3.15.1.1	Hydraulic System (Cont)
	Deviation:	Remote reading indicators may be used.

Reason for Change and Remarks: To eliminate the routing of high pressure hydraulic lines within the cockpit area.

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200	3.15.1.1	Hydraulic System
	Requirement:	Paragraph 3.8.25.4 - "Normal ground-servicing, fluid-level range shall be indicated with the accumulator or accumulators completely discharged of oil pressure and another level range to indicate the safe operating limit with accumulators charged to normal air and oil pressure."
	Deviation:	Indication of fluid level range, with accumulators filled with oil, is not required.

Reason for Change and Remarks: It is not practical to fill the reservoir with the system in operation and accumulators filled with oil.

* * * *

201	3.15.1.1	Hydraulic System
	Requirement:	Paragraph 3.8.25.5 - "The reservoir pressure shall be controlled by an external, nonadjustable pressure regulating device set to 12 psig (26.7 psi) absolute which shall be connected to the air space above the oil level in the reservoir to protect the reservoir from rupturing..."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec No. MIL-H-5440 (Cont)
201 (Cont)	3.15.1.1	Hydraulic System (Cont)

Deviation: Pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of hydraulic pumps.

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202	3.15.1.1	Hydraulic System

Requirement: Paragraph 3.8.29.3 - "The pressure drop from the reservoir to the pump intake port....shall be such that the pressure at the inlet port will not be less than 14 inches of mercury absolute nor more than 12 psig (26.7 psia)."

Deviation: Applicable, except as modified in deviation to paragraph 3.8.25.5 of MIL-H-5440.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-D-5481 dated 13 December 1949 Drawings and Data Lists; Preparation of (For Production Aircraft)
203	Requirement:	Paragraph E-3a. - "A general arrangement (complete assembly) drawing, drawings of all necessary assemblies and subassemblies, and separate detail drawings shall be made for all parts of the aircraft (except as specifically exempted herein). Figure 4 shows the installation and major assembly drawings required for conventional aircraft design. If any of the drawings listed in Figure 4 are not applicable to the specific aircraft design, applicable installation and major assembly drawings shall be substituted." Paragraph E-3d - "Assembly Drawings. - The assembly drawings for such items as wing panels, wing tips, rudder, stabilizers, etc., shall be complete units containing all necessary electrical, hydraulic, and fuel systems, etc., already installed, and shall clearly indicate that these installations are included as part of the assembly to which they pertain. Thus, the wing panel assembly drawing may be an outline drawing only, calling out the separate drawings covering the installation of the wing panel hydraulic system, electrical system, detail wing structure assembly, etc., as subassembly drawings."
	Deviation:	In lieu of a single airplane general assembly drawing the aircraft shall be defined by four top general arrangement or assembly drawings as noted below. All electrical, electronic instrument and instrumentation equipment, harness, installations, etc., not included as part of the basic structure shall be excluded from the major component assembly drawings. All electrical, electronic, instrument, and instrumentation items shall next assemble into their applicable general assembly drawings.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL- Spec MIL-D-5481 (Cont)
203 (Cont)		Airplane General Assembly Instrumentation General Assembly Electronic General Assembly Electrical & Instrumentation General Assembly

It shall be permissible to issue "typewriter" drawings to define major assembly spares.

Reason for Change and Remarks: The extensive and accelerated test programs established for these airplanes will necessitate numerous changes in each airplane, or small blocks of airplanes, to accomplish the end tests. From an analysis, these items subject to change fall within the electrical, electronic, instrument and instrumentation categories. Changes is these categories could cause creation of a complete number brakdown, including major assembly, for each airplane. In order to expedite the program, maintain a record of each airplane, establish spares applicable to all (or a majority of) airplanes and reduce the tast of number changing to a minimum the plan was evolved to separate the changeable categories from the basic airplane. To provide for major assembly spares usable on all (or a majority of) airplanes, a series of spares (typewriter) drawings would be established which would contain the necessary provisions to permit maximum usage. To use drawings common to F-102A airplane.

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204 2.3 Applicable Specifications

Requirement: Paragraph E-3h - "The flat pattern of all sheet metal parts shall be shown.

Deviation: It shall not be required that the flat pattern of all sheet metal parts be shown.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL Spec MIL-D-5481 (Cont)
204 (Cont)	2.3	Applicable Specifications (Cont)

Reason for Change and Remarks: Sufficient information, will be shown on the drawings to permit development of a flat pattern and/or fabrication and parts. This is Contractor's standard practice at the Forth Worth Division.

Regarding paragraph E-3h (2), the contractor proposes to furnish for that section of the aircraft being designed at Contractor's Fort Worth Division, reproducibles made directly from the glass cloth drawings on which is superimposed an accurate 10" grid. Approval of this Deviation shall constitute approval of this procedure.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-C-5503A, dated 7 April 1950 Cylinders; Aircraft, Hydraulic Actuating
205	3.8	Alighting Gear
	Requirement:	Paragraph 4.5.7 - Extreme Temperature Performance (Testing methods described under paragraphs 4.5.7, 4.5.7.1, 4.5.7.2, and 4.5.7.3).
	Deviation:	Extreme temperature testing of landing gear actuating cylinders shall be performed on entire landing gear strut assembly to that requirement.

Reason for Change and Remarks: Testing of actuating cylinders separately would be duplicate testing. (See Convair Ltr 6-1638 dated 16 April 1953 and AMC Ltr MCPPAF-6 (WCOWF-6) RGA/ah dated 1 July 1953).

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5514A, dated 7 June 1950 - Packings; Installation and Gland Design of Aircraft Hydraulic and Pneumatic (General Specification for)
206	3.15.1.1	Hydraulic System - Description and Components
	Requirement:	Paragraph 1.1 - "This specification is drawn to establish basic design criteria covering use and application of packings, packing glands, and related features as used in hydraulic system equipment in accordance with Specification No. MIL-H-5440, using MIL-O-5606 hydraulic fluid, and in pneumatic system applications, in accordance with Specification No. MIL-P-5518."
	Deviation:	Applicable, except that special seals may be required for local high temperature conditions. Such special seals shall be submitted to WADC for specific approval for each kind of application.

Reason for Change and Remarks: The seals of Specification No. MIL-P-5514 are not suitable for high temperature use.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-5518, dated 3 January 1950 - Pneumatic Systems; Design, Installation and Test of Aircraft
207	3.15.2	Pneumatic System

Requirement: Paragraph E-3b(2) - "Pneumatic units such as air bottles shall withstand a proof pressure equal to 200% of the system cut-off pressure."

Deviation: Proof pressure shall be 5/3 times the system cut-off pressure. (Reference Convair Specification No. 8-08359.)

Reason for Change and Remarks: Air bottles will be nonshatterable and shall withstand gunfire test. Higher testing pressures shall not be required.

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Deviation	Paragraph	
208	3.15.2	Pneumatic System

Requirement: Paragraph E-3C(2) - "Air bottles shall be capable of withstanding a burst pressure equal to 200% of the proof pressure."

Deviation: Burst pressure shall be 20/9 times the system cut-out pressure. (Reference Convair Specification 8-08359.)

Reason for Change and Remarks: Air bottles will be nonshatterable and shall withstand gunfire test. Higher testing pressure should not be required.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-P-5518 (Cont)**

209 3.15.2 Pneumatic System

Requirement: Paragraph E-4 - "The pneumatic system shall operate satisfactorily within the range of outside air temperatures and altitudes shown in Figure 1. Under none of these conditions shall the temperature of the air under main system pressure in the air bottles and the remainder of the pneumatic system after the air bottles, exceed 71°C (160°F) during system operation. In the event that units such as hoses and valves located ahead of the air bottles would be adversely affected by temperatures above 71°C (160°F) provisions shall be made to limit the temperature of 71°C (160°F) during system operation."

Deviation: Component temperatures may exceed 160°F.

Reason for Change and Remarks: Components will be subjected to temperatures above 160°F due to aerodynamic and engine heating. There is insufficient cooling to maintain temperatures of 160°F or lower. These components will be designed and tested to insure proper operation at the temperatures they are exposed to.

* * * *

210 3.15.2 Pneumatic System

Requirement: Paragraph E-9c, last sentence - "Aluminum alloy fittings shall not be used with stainless steel lines."

Deviation: It shall be permissible to use male threaded aluminum alloy fittings with stainless steel lines in sizes -8 and above.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-P-5518 (Cont)
210 (Cont)	3.15.2	Pneumatic System (Cont)

Reason for Change and Remarks: This deviation, which will accomplish a maximum weight saving in design of the pneumatic system conforms with Para. 3.9.10 of MIL-P-5518A dated 3-26-53 (Ref CVAC ltr 6-1750 dtd 20 April 1954. Dev. approved by AMC ltr MCPPAF-6 (WCSF-6) SSS/feb dtd 28 June 1954.)

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211	3.15.2	Pneumatic System

Requirement: Paragraph E-13a(1) - "The ground charging connection shall be installed in accordance with Drawing AND 10071. . ."

Deviation: Applicable, except that AND 10071 valve installation may be replaced by a valve permitting greater air flow.

Reason for Change and Remarks: To reduce ground charging time.

* * * *

212	3.15.2	Pneumatic System

Requirement: Paragraph E-22a(1) - "The use of all packings shall be as specified in Spec. No. AN-P-74."

Deviation: Applicable, except that in special cases where friction forces are detrimental, other types of packings may be used subject to WADC approval.

Reason for Change and Remarks: Friction may be critical in certain valves.

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SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO 222 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor request - Ref. Convair Ltr. 6-2993 dtd 6-25-54. AMC approval Ltr MCPHFC(WCSF-6) RGA/hds dtd 9-14-54. CCN #6N-3031(204), CCN #6N-3032(55), CCN #6N-3033(24), CCN #6N-3034(2)

PARAGRAPH NO. CHANGE

APPENDIX II - Spec. MIL-P-5518

ADD: Deviation 213a

213a 3.15.2 Pneumatic System

Requirement: Paragraph E29b - "Pneumatic units shall not fragment when subjected to gunfire......"

Deviation: Pneumatic bottles positioned on the landing gear struts shall not be subjected to gunfire tests.

Reason for Change and Remarks: The air bottles are basically a structural part of the landing gear and that reduction of the ultimate tensile strength from the present range to some lower value might enable them to pass the gunfire test, but would also result in an increase in weight. Also, under normal conditions, the gear will be retracted within the airframe, therefore, a relatively small area would be exposed to gunfire.

AIRPLANES AFFECTED: All

BY

APPROVED BY

FORM 6189-2

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 222 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor request - Ref. Convair Ltr 6-3333 dtd 29 June 1955. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033 (24) CCN #6N-3034(2).

PARAGRAPH NO. CHANGE

APPENDIX II - Spec. MIL-P-5518

CHANGE: Deviation 213 to read as follows (Deviation & Reason).

Deviation: (1) A low pressure warning light will be provided.
(2) Gages other than AN standard may be used, subject to WADC approval.

Reason for Change and Remarks:

(1) To simplify instrument panel and reduce weight as approved by F-102A cockpit Mock-Up Board 28 July 1954.
(2) It is not the purpose of these gages to give a precise reading, but only to serve as an approximate visual check on the pressure condition of the system. Therefore, gages have been selected in preference to AN gages because of their light weight simplicity and more rugged construction. (Deviation recommended by F-102A CTCI Board of 25-27 May 1955.)

AIRPLANES AFFECTED: All

BY

APPROVED BY C. A. [illegible]

FORM 5188-2

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-P-5518 (Cont)
213	3.15.2	Pneumatic System

Requirement: Paragraph E-25a - "Pressure gages AN5769 or AN5771, in accordance with Specification AN-G-2, shall be provided..."

Deviation: A low pressure warning light will be provided.

Reason for Change and Remarks: To simplify instrument panel and reduce weight and as approved by F-102A cockpit Mock-up Board 28 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-R-5520, dated 3 January 1950 - Reservoirs: Hydraulic
214	3.15.1.1	Hydraulic System
	Requirement:	Paragraph E-1i(2) - "Where pressurized reservoirs are used, means shall be provided to limit internal pressures to a maximum of 12 pounds per square inch gage."
	Deviation:	Applicable, except that the pressure shall be determined by pump requirements.

Reason for Change and Remarks: To conform with pressure requirements of the hydraulic pumps."

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-5842 (USAF) dated 1 September 1950 - Transparent Areas; Anti-Icing, Defrosting and Defogging Systems, General Spec. for:
215	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.2.2.1 - "The windshield shall be defined as the transparent area or areas which are intercepted by a line through the eyepoint of the pilot (or copilot) in the forward and forward oblique direction (approximately 45° to either side of straight ahead) and which are normally used in flying and landing the aircraft."

Deviation: The windshield shall be defined as the glass area forward of the canopy break line.

Reason for Change and Remarks: Surface of transparent area aft of canopy break line is essentially parallel to free stream and will not be subjected to direct water impingement.

* * * *

216	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas

Requirement: Paragraph 3.3.1 - "All transparent areas essential to the mission....."

Deviation: The canopy transparent material will not be defrosted or defogged.

Reason for Change and Remarks: Defrosting and defogging protection is provided for the windshield in conformance with Spec MIL-T-5842.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-5842 (USAF) (Cont)
217	3.20.2.2	Anti-Icing, Defrosting and Defogging of Transparent Areas
	Requirement:	Paragraph 3.6 - "A clear vision panel (one which is openable in flight under conditions of ice, front and fog), or a section of transparent area maintained in a clear condition under conditions of ice, frost and fog, shall provide vision to the pilot in the event of failure of the normal defroster, defogging, or anti-icing system or systems."
	Deviation:	Emergency vision as defined in paragraph 3.6, 3.6.1, and 3.6.2 of Specification No. MIL-T-5842 will not be provided.

Reason for Change and Remarks: An openable panel is not considered practicable from the standpoint of clearance required and obstruction to pilot's vision due to framework required.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-5997 (USAF) dated 31 January 1951, Instruments and Instrument Panels Aircraft, Installation of
218	3.14.3	Installation - Instruments
	3.19.2.1	Panel - Installation
	Requirement:	(1) Paragraph 3.1.2 - "The main instrument panel (s) shall be mounted normal to the longitudinal axis of the airplane." (2) Finish - "The finish of the instrument panel shall be durable dull black." (3) Paragraph 3.2.1 - "All instrument panels shall be mounted on vibration absorbers constructed in accordance with the requirements of Specification MIL-A-5840." (4) Paragraph 3.3.4 - "The transmitters shall be mounted in a location where the temperature never exceeds 70 °C."
	Deviation:	(1) The instrument panels shall be mounted with a slope of 15° measured forward of the plane normal to the longitudinal axis of the airplane. The J-8 attitude gyros shall be normal to flight attitude of the airplane. (2) The finish of the instrument panels shall be dark grey, Color No. 3520 of color specification TT-C-595. (3) Instrument panels shall not be mounted on vibration absorbers. Space provisions shall be made for vibration isolators and/or vibrators pending results of flight tests. (4) Instrument transmitters shall be mounted in compartments in which the temperatures shall not exceed 70°C for extended periods but may reach 120°C for periods not to exceed 15 minutes duration.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-I-5997 (USAF) (Cont)

218 (Cont) Reason for Change and Remarks: (1) To provide maximum visibility over the instrument panels, provide optimum visibility of the instruments on each panel and provide for the maximum number of instruments on the students panel while maintaining the optimum location of the radar scope. (2) Per F-102A mock-up board meeting 28-29 July 1954, RFA No. 48. (3) Experience with aircraft powered with gas turbines has indicated that the vibration transmitted to the instrument panel is within acceptable limits. (4) It is not considered necessary to use special transmitters for high temperature operation since high temperature, if for a limited time only, will not cause the temperature of the units to rise sufficiently to cause damage.

* * * *

219 3.19.2.1 Instrument Panel

Requirement: Paragraph 3.3.5 - Maintenance - All instruments and connections thereto shall be accessible for replacement without removing other instruments or equipment.

Deviation: The requirements of the above paragraph need not be adhered to.

Reason for Change and Remarks: Plastic sandwich lighting of the instrument panels makes it impossible to meet the requirements of the above paragraph. Sandwich lighting was requested by the Procuring Agency at F-102A lighting Mock-up.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-6051 dated 28 March 1950, Interference limits and Methods of Measurement; Aircraft Radio
220	3.17	Electronics

Requirement: Complete Specification.

Deviation: During accelerated development test program isolation and correction will not be made to noise interference caused by test instrumentation or special configuration installed.

Reason for Change and Remarks: Time involved and cost would prohibit isolation and correction of noise interferences caused by the temporarily installed special test instrumentation.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-T-6053, dated 1 June 1950 - Tests; Landing Gear Shock Absorber Drop
221	3.8.2.4	Shock Absorbers - Main Landing Gear
	3.8.4.4	Shock Absorbers - Nose Landing Gear

Requirement: Complete specification.

Deviation: Since the nose and main landing gears are the same as F-102A Airplanes, no testing is required on this airplane.

Reason for Change and Remarks: To use existing components of the F-102A airplane.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-6140 dated 27 April 1950 "Insignia National Aircraft"
222	3.2.7	Identification and Markings

Requirement: Paragraph D2a (2) - "The insignia shall have a blue circle, excluding the border, with a maximum diameter of 60" and a minimum diameter of 30". Standard sizes shall have a blue circle diameters in multiples of 5". The blue circle diameter selected shall be the standard size which is closest to, but does not exceed 75% of the distance between the leading edge of the wing and the aileron cut out at the point of application."

Deviation: A blue circle of 40" diameter shall be used as specified on CVAC Drawing 8-90903.

Reason for Change and Remarks: Due to the Delta wing configuration, the Contractor arbitrarily chose a 40" diameter circle since it appears to be of adequate size and in keeping with the span of the wing, and conforms with the F-102A.

* * * *

223	3.2.7	Identification and Markings

Requirement: Paragraph D-2b (2), Size - "The insignia shall have a blue circle, excluding the border, with a maximum diameter of 50" and a minimum diameter of 20". Standard sizes shall have a blue circle diameter in multiples of 5". The diameter selected shall be the standard size which comes nearest to, but does not exceed 75% of the height of the projection of the fuselage or hull side of the point of application."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-I-6140** (Cont)

223 (Cont) 3.2.7

Deviation: The size and location of the national insignia on the fuselage shall be submitted to WADC for approval.

Reason for Change and Remarks: It is impossible to comply with the above requirements due to the fuselage configuration, wing location, and to afford placement of the insignia in such a position that it could be viewed without distortion.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-A-6224A, dated 25 September 1950 - Antenna for UHF Airborne Communications Equipment, General Specification for Design of
224	3.17.2.1.1	Radiation Pattern

Requirement: Paragraph 3.2.2.5 - "The antenna, when installed on an aircraft, shall receive and transmit a substantial amount of the total available energy as vertically polarized radiation within the zone between 30 degrees above and 30 degrees below the horizon. The azimuthal radiation patterns within the fore-going zone shall be free from deep null and sharp variations in gain."

Deviation: The azimuthal radiation patterns within more than 95% of the fore-going zone shall be free from deep nulls and sharp variations in gain.

Reason for Change and Remarks: Some deep nulls and sharp variations in gain are unavoidable consequences of the particular external configuration of this airplane and are therefore not controlable by the antenna design. Deep nulls and sharp variations in gain are defined as those variations in gain which drop to a value less than the gain of an isotropic radiator by at least 11 db.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A dated 18 January 1952 - Lighting Equipment, Aircraft Instrument Panel - General Specification for Installation of
224a	3.16.8.2	Interior Lighting

Requirement: Paragraph 3.2.2 - "The required types and quantity of aircraft lighting equipment shall be listed in the aircraft model specification."

Deviation: It shall not be required to list all aircraft lighting equipment by types and quantity in the aircraft model specification.

Reason for Change & Remarks: The major items of equipment are listed in the aircraft model specification by description only. The equipment section of the Contractor's Bill of Materials specifies the quantity and part numbers for all Contractor furnished equipment. To list this information in the Model Specification, and maintain it up to date, would be an unnecessary duplication of work.

225	3.16.8.2	Interior

Requirement: Paragraph 3.2.3.1 - The primary instrument lighting system shall consist of individual instrument lighting fixtures as specified by the Procuring Agency.

Paragraph 3.2.3.1.3 - Individual fixture for clamp mounted instruments. The fixture for the clamp mounted instruments shall be in accordance with Specification MIL-L-7581. Where instrument panel space prevents, the fixture shall be located above the top center of the instrument to be illuminated. In any event the fixture shall be located so as to permit the crew members, when seated in their normal positions, from seeing direct light from the fixtures, direct reflections of the light from the face of the instrument, or from the windshields.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A (Cont)
225 (Cont)	Requirement: (Cont)	The final location shall be subject to the approval of the Procuring Agency.
	Deviation:	Sandwich type lighting of instruments may be used.
	Reason for Change and Remarks:	Sandwich type lighting of instruments requested by an approved by Mock-Up Board 7-8 April 1953, RFA #1.

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Deviation	Paragraph	
226	3.16.8.2	Interior:
	Requirement:	Paragraph 3.2.3.2 - The secondary instrument lighting system shall consist of Type A-11 red floodlights conforming to Specification No. 32639.
	Deviation:	Type A-11 red floodlights need not be used for the secondary instrument lighting system.
	Reason for Change and Remarks:	The light distribution of the A-11 floodlight is not compatible with the requirements for adequate lighting of this cockpit configuration. To maintain design identical to F-102A airplane.

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Deviation	Paragraph	
226a	3.16.8.2	Interior:
	Requirement:	Paragraph 3.2.3.3 - "The cockpits of all Air Force aircraft equipped for night flying shall be furnished with thunderstorm lights. The intensity and location of the lights shall be such that a light intensity of at least 10 ft candles is provided on the instrument panel."
	Deviation:	The average lighting intensity of the thunder storm lights on the instrument panel shall not be less than 7 ft candles.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-L-6423A (Cont)**

226a (Cont) **Reason for Change and Remarks**: Adequate thunderstorm lighting is provided as demonstrated at the cockpit lighting inspection held 30 Nov. - 1 Dec. 1954 (Ref RFA #20 of this inspection.

227 3.16.8.2 Interior

Requirement: Paragraph 3.2.3.4 - Provisions shall be made for controlling the light intensity of the primary system separately from that of the secondary system. Furthermore, the light assemblies shall be grouped on intensity controls in such a manner as to permit the pilot and copilot to control the light intensity of his flight instrument group separately from that of his engine instrument group. In the event that the cockpit arrangement is such that the pilot and copilot use the same group of engine instruments, the intensity control for this engine group shall be located so that it is readily accessible to both the pilot and copilot.

Deviation: Intensity control of instrument secondary lighting may be by only one control and need not be separately grouped as to flight instruments and engine instruments. This control will be located on the student's skirt panel, as presented at Cockpit Lighting Inspection of 30 Nov.-1Dec. 1954.

Reason for Change and Remarks: Configuration and limited area of instrument panels are such that separation of secondary lighting per specification is impractical and entirely unnecessary as was demonstrated in the F-102A lighting mockups and accepted by the Mock-Up Board 7-8 April 1953. To maintain design identical to F-102A airplane.

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228 3.16.8.2 Interior

Requirement: Paragraph 3.2.3.5 - The power for the primary and secondary instruments lighting systems shall be taken

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | Military Specification No. MIL-L-6423A (Cont)

228 (Cont) **Requirement:** (Cont) from an essential supply bus.

Deviation: The secondary lighting shall be supplied from the non-essential A.C. bus.

Reason for Change and Remarks: To stay within the requirements of the emergency A.C. generator. The output of this generator is limited by the hydraulic power during "Dead Stick" landing.

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229 3.16.8.2 Interior

Requirement: Paragraph 3.2.6 - Dimming Controls - "Inclosed type rheostats in accordance with Specification MIL-R-22 or MIL-R-6749 and Standard AN3155 shall be used as dimming controls for instrument lighting systems ...."

Deviation: Variable voltage autotransformers may be used for dimming controls on lighting circuits supplied from A.C. sources.

Reason for Change and Remarks: Some instrument panel lights are to be operated from the A.C. bus to conserve battery power during emergency as approved by F-102 Cockpit Mock-Up Board of 28 July 1954.

* * * * *

230 3.16.8.2 Interior

Requirement: Paragraph 3.2.6.3 - Intensity Levels of Thunderstorm Lights - "The dimming controls for the thunderstorm lights shall provide a means for varying the voltage across the lamps from a maximum of approximately rated lamp voltage to 1/4 rated lamp voltage."

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 237

DATE 22 May 1956

CHANGE (ECP) NO. 1126

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291, dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem, dtd 31 Jan. 1956. CCN #62 MSN 7N-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

ADD:

Deviation	Paragraph	MIL-L-6503(USAF) (Cont)
232a	3.16.8.3	Exterior Lights
	Requirement:	Paragraph 3.2.1.1.2 - Tail position light assemblies shall be installed in accordance with requirements of Specification MIL-L-6730.
	Deviation:	Delete paragraph in its entirety.

Reason for Change and Remarks: Installation of rotating red beacon (1 each upper and lower fuselage) render fuselage and tail position lights ineffectual and unnecessary. AMC acceptance letter MCPHFC(RDZSFG)1-5 WES/jem dated 31 Jan. 1956. (Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

AIRPLANES AFFECTED:

BY

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FORM 618C

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Page 1 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 237

DATE 22 May 1956

CHANGE (ECP) NO. 1126

MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291, dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem dtd 31 Jan. 1956. CCN #62 MSN ZN-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-L-6503(USAF) dated 5 July 1951, Lighting Equipment, Aircraft, General Specification for Installation of

FROM:

231	3.16.8.3	Exterior Lights
	Requirement:	Paragraph 3.2.1.1 - Navigation Light System ".... shall be electrically connected to the navigation light system as shown on Figure 1."
	Deviation:	The AN3131-303 lamp called for fuselage lights may be omitted and equivalent dimming accomplished by the use of tapped transformer, with similar treatment for dimming of the wing and tail lights in lieu of resistors.

Reason for Change and Remarks: Navigation lights will be energized by A.C. sources to conserve battery power during emergency and to save weight.

TO:

231	3.16.8.3	Exterior Lights
	Requirement:	Paragraph 3.2.1.1 - Navigation Light System "... shall be electrically connected to the navigation light system as shown on Figure 1."
	Deviation:	The AN3131-303 lamp called for fuselage lights may be omitted and equivalent dimming accomplished by the use of tapped transformer, with similar treatment for dimming of the wing and tail lights in lieu of resistors.

Reason for Change and Remarks: Navigation lights will be energized by A.C. sources to conserve battery power during emergency and to save weight.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2379)

AIRPLANES AFFECTED:

BY

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SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-S-004A
FILE OPPOSITE PAGE NO. 237 (Cont) **DATE** 22 May 1956
CHANGE (ECP) NO. 1126 **MODEL** TF-102A **REVISED** 20 May 1957
CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291, dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem, dtd 31 Jan. 1956. CCN #62 USN ZN-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

	Deviation	Paragraph	MIL-L-6503(USAF) dated 5 July 1951, Lighting Equipment, Aircraft, General Specification for Installation of
ADD:	231	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.1 - Navigation Light System - "A type C-2 position light flasher, in accordance with Spec. No. 32660, shall be electrically connected to the navigation light system as shown on Figure 1"...etc. thru " in the event the Contractor decides to use this method of mounting he shall submit a mock-up of the proposed transparent enclosures with the light assembly mounted in the proper location with respect to the enclosure, to the laboratory of the Procuring Agency for Photometric Tests and approval prior to incorporating the proposed installation into any aircraft being procured by the Air Force."

Deviation: Delete that portion of Paragraph 3.2.1.1 as noted above.

Reason for Change and Remarks: Installation of rotating red beacon (1 each upper and lower fuselage) render fuselage and tail position light ineffectual and unnecessary.
(Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

AIRPLANES AFFECTED:

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FORM 618C

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6423A (Cont)
230 (Cont)	Deviation:	Dimming shall not be provided.
	Reason for Change and Remarks:	RFA #66 - F-102A Cockpit Mock-Up Board 28-29 July 1954.

* * * * *

Military Specification No. MIL-L-6503 (USAF) dated 5 July 1951 - Lighting Equipment: Aircraft, General Specification for Installation of

231	3.16.8.3	Exterior Lights
	Requirement:	Paragraph 3.2.1.1 - Navigation Light System - " .... shall be electrically connected to the navigation light system as shown on Figure 1."
	Deviation:	The AN 3131-303 lamp called for fuselage lights may be omitted and equivalant dimming accomplished by use of tapped transformer, with similar treatment for dimming of the wing and tail lights in lieu of resistors.
	Reason for Change and Remarks:	Navigation lights will be energized by A.C. sources to conserve battery power during emergency and to save weight.

* * * * *

232	3.16.8.3	Exterior Lights
	Requirement:	Paragraph 3.2.1.1.1 - Wing Position Light Assemblies - The Wing position light assemblies shall be installed in accordance with Specification No. MIL-L-6730, etc. Light assemblies and associated equipment are included in Table I.
	Deviation:	Special lights may be installed as required and as approved by the Procuring Agency.

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 238 **DATE** 22 May 1956

CHANGE (ECP) NO. 1126 **MODEL** TF-102A **REVISED** 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291 dtd 30 Nov. 1955. AMC ltr. MCPHFC(RDZSFG)1-5 WES/jem dtd 31 Jan. 1956. CCN #62 MSN 7N-4806 dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

FROM:

Deviation	Paragraph	MIL-L-6503(USAF) (Cont)
233	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.1.3 - Fuselage light assemblies shall be installed in accordance with Specification MIL-L-6730 etc. The assemblies shall be connected into the electrical circuit as shown on Figure 1.

Deviation: (1) Special lights may be installed as required and as approved by the procuring agency.
(2) The position lights shall be operated from the 115 volt A.C. essential bus through suitable transformers. Dimming shall be accomplished by use of appropriate taps on the transformer.

Reason for Change and Remarks: (1) Aerodynamic design considerations and the configuration of the wing, tail, and fuselage dictate the use of special exterior lights and circuitry. This installation was approved by WADC.
(2) To provide greater endurance for the D.C. emergency power source, the essential bus is energized, during emergency, by the hydraulic driven A.C. generator. To save wire, thus reducing weight.

TO:

Deviation	Paragraph	
233	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.1.3 - Fuselage light assemblies shall be installed in accordance with Specification MIL-L-6730 etc. The assemblies shall be connected into the electrical circuit as shown on Figure 1.

AIRPLANES AFFECTED:

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Page 2 of 2

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 238 (Cont)
DATE 22 May 1956
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MODEL TF-102A
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AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291 dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem dtd 31 Jan. 1956. CCN #62 MSN 7N-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation Paragraph MIL-L-6503(USAF) (Cont)

TO: Cont)

Deviation: (1) Special lights may be installed as required and as approved by the procuring agency.
(2) The position lights shall be operated from the 115 volt A.C. essential bus through suitable transformers. Dimming shall be accomplished by use of appropriate taps on the transformer.

Reason for Change and Remarks: (1) Aerodynamic design considerations and the configuration of the wing, tail, and fuselage dictate the use of special exterior lights and circuitry. This installation was approved by WADC.
(2) To provide greater endurance for the D.C. emergency power source, the essential bus is energized, during emergency, by the hydraulic driven A.C. generator. To save wire, thus reducing weight.
(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2335)

ADD:

233 3.16.8.3 Exterior Lights

Requirement: Paragraph 3.2.1.1.3 - "Fuselage light assemblies shall be installed in accordance with Specification MIL-L-6730 etc. The assemblies shall be connected into the electrical circuit as shown on Figure 1."

Deviation: Delete entire paragraph.

Reason for Change and Remarks: Installation of rotating red beacon (1 each upper and lower fuselage) render fuselage and tail position lights ineffectual and unnecessary. AMC Ltr. MCPHFC (RDZSFG)1-5 WES/jem dtd 31 Jan. 1956.
(Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

AIRPLANES AFFECTED:

BY

APPROVED BY

FORM 618C

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (USAF) (Cont)
232 (Cont)	Reason for Change and Remarks:	Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights. (Ref CVAC Ltr 8-3686 dated 17 July 1952, Paragraph 3.2)

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233	3.16.8.3	Exterior Lights
	Requirement:	Paragraph 3.2.1.1.3 - Fuselage light assemblies shall be installed in accordance with Specification MIL-L-6730 etc. The assemblies shall be connected into the electrical circuit as shown on Figure 1.
	Deviation:	1. Special lights may be installed as required and as approved by the procuring agency. 2. The position lights shall be operated from the 115 volt A.C. essential bus through suitable transformers. Dimming shall be accomplished by use of appropriate taps on the transformer.
	Reason for Change and Remarks:	1. Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights and circuitry. This installation was approved by WADC. 2. To provide greater endurance for the D.C. emergency power source, the essential bus is energized, during emergency, by the hydraulic driven A.C. generator. To save wire, thus reducing weight.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-L-6503 (USAF) (Cont)
234	3.16.8.3	Exterior Lights

Requirement: Paragraph 3.2.1.3 - Taxi Lights - "The part number of the taxi lamp assembly is shown in Table I."

Deviation: Special light assembly suitable to the configuration of this airplane may be installed and shall be approved by the Procuring Agency.

Reason for Change and Remarks: Taxi light assemblies shown in Table I cannot be mounted satisfactorily in this airplane.

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235 Deleted

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (USAF) (Cont)
236	3.16.8.2	Interior Lights

Requirement: Paragraph 3.2.2.2 - Control Panel Lighting: All aircraft equipped for night flying shall have the labels, information plates, marking and other necessary indications, which are required for the operation of the control panel equipment, illuminated by use of light assemblies in accordance with Drawing AN-3502 or other types of assemblies approved by the Procuring Agency in conjunction with plastic lighting plates in accordance with Specification AN-P-89.

Deviation: Secondary lighting, in addition to primary lighting shall be provided for lighting the console. Secondary lighting may be used for lighting the side and aft circuit breaker panels. Plastic lighting plates need not be employed on the circuit breaker panels. Plastic lighting plates, when used, shall be in accordance with specification MIL-P-7788 in lieu of AN-P-89.

Reason for Change and Remarks: Secondary along with primary lighting of the consoles is recommended as a safety measure in the event of primary failure, and to give balanced cockpit lighting which is important to efficient night adaptation. Configuration location, and "in flight" need of lighting circuit breaker panels during night operation is such that primary lighting, per specification would be an unnecessary burden of weight, circuity and space utilization in view of pilot pratice of carrying some secondary light intensity during night operations as approved by F-102A Cockpit Mock-Up Board 28 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6503 (USAF) (Cont)
237	Deleted	

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238	3.16.8.2	Interior Lights

Requirement: Paragraph 3.2.2.5 - Cabin Lighting: Cabin dome lights in accordance with Drawing AN3037 shall be used to provide general illumination of the radio, radar, navigator, bombardier, passenger, cargo, and engine nacelle compartments of aircraft.

Deviation: It shall be permissible to install Grimes light assembly (Drawing No. B-6245-24) in lieu of AN3037 light assembly.

Reason for Change and Remarks: AN3037 light assemblies are too large and heavy to be practicable for this type of airplane. The use of Grimes light assembly was approved by the F-102A Mock-Up Board.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec No. MIL-L-6503 (USAF) (Cont)
239	3.16.11.3	Warning Lights

Requirement: Paragraph 3.2.2.8.1 - "Warning lights shall be red non-dimming, small jewel in accordance with Drawing AN3157, and shall be provided in connection with systems over which operating personnel have no control and gives a warning of trouble not caused by personnel action and indicates immediate action required to prevent immediate loss of aircraft."

Deviation: (a) All warning lights are automatically dimmed when the flight instruments primary lights are turned on, except that they shall not be dimmed when the thunderstorm lights are on.

(b) Warning lights shall be of the two-bulk type similar to "Korry P/N 204...."

Reason for Change and Remarks: (a) To alleviate the possibility of the pilot being blinded when a warning light comes on. The configuration of the cockpit and the mission of the airplane necessitates the integration of the entire cockpit for maximum utility and the warning system particularly will be of nonstandard configuration. (Requested and approved by F-102A Mock-Up Inspection Board on 7 and 8 April 1953, RFA #8, and F-102A cockpit Mock-Up Inspection on 29 July 1954).

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240	3.16.11.3	Warning Lights

Requirement: Paragraph 3.2.2.8.2 - Caution Light: "Caution Lights shall be amber, dimming, small jewel, in accordance with Drawing AN3157...."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-Spec No. MIL-L-6503 (USAF) (Cont)
240 (Cont)	3.16.11.3	Warning Lights (Cont)

Deviation: Caution light shall be of the two-lamp type similar to "Korry P/N 204. . . ."

Reason for Change and Remarks: Master warning light was declared to be a "Caution Light" by F-102A Mock-Up Board of 7 and 8 April 1953 and 28 and 29 July 1954, which brings it under this specification requirement. However, in size and arrangement, it must be treated similarly to the regular warning lights.

* * * *

241	3.16.8.2	Interior Lights
	3.19.7	Spare Bulbs

Requirement: Paragraph 3.2.3 - Spare Lamps: "All aircraft shall be furnished with one spare lamp for each 3 lamp assemblies (or fraction thereof) of each different type of lamps used for interior lighting.

Deviation: To provide stowage for a minimum of 10 spare midget flanged base lamps only in addition to the normal requirements for spare candelabra and miniature based lamps.

Reason for Change and Remarks: Compliance with the above requirement would result in provisioning for stowage of 50 spare midget flanged based lamps. The Contractor believes this would be an unwarranted waste of space and weight considered against the realities of spare lamp replacement accomplished by the pilot during any mission. Also, the loss of one lamp on any one instrument does not render the instrument nonvisible. Approved by F-102A Cockpit Mock-Up Board 28 July 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-A-6543 Antenna System, L Band, Omni-Directional General Specification for
242	3.17.3.8.1	Radiation Pattern

Requirement:

3.4.6 - Field Strength Pattern - The field strength pattern of the installed antenna system shall be essentially omni-directional in the horizontal plane. The minimum acceptable voltage field strength pattern shall be as follows, using the spherical coordinate system as illustrated in Figure 1.

3.4.6.1 - At any azimuth angle Ø in the planes defined by the angle $\theta = \pm 5^\circ$, the field strength shall be equal to or greater than that of an isotropic radiator in free space with equal input power.

3.4.6.2 - At any azimuth angle Ø in the planes defined by $\theta = 80 \pm 5^\circ$, the radiation loss shall not exceed 1 decibel with respect to an isotropic radiator in free space with equal input power.

3.4.6.3 - At any azimuth angle Ø in all planes from $\theta = 50^\circ$ to $\theta \pm 75^\circ$ and from $\theta = 105^\circ$ to $\theta = 130^\circ$, the radiation loss shall not exceed 4 decibels with respect to that of a free space isotropic radiator of equal input power except as modified in 3.4.6.4.

3.4.6.4 - In either the upper or lower hemisphere, but not both, from $\theta = 50^\circ$ to $\theta = 75^\circ$ or from $\theta = 105^\circ$ to $\theta = 130^\circ$, a minimum or minimums of field strength may exist having a total azimuth angle Ø, as measured between the -4 decibels gain points, of not more than 90° in any plane. However, the radiation loss at such a minimum or minimums shall not exceed 10 decibels with respect to an isotropic radiator in free space with equal input power.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Spec. No. MIL-A-6543 (Cont)
242 (Cont)	Deviation	The field strength pattern of the installed antenna system shall be the multilobed pattern which results when two antennas, which are separated by several wave-lengths, are fed in parallel.

An any azimuth angle ϕ in the planes defined by the angle $\theta = 90 \pm 40°$, the envelope of this multilobed pattern shall represent field strength equal to or greater than that of an isotropic radiator in free space with equal input power, except as follows:

A deep null in the previously specified envelope shall exist in the solid angle defined by $\phi = 180 \pm 10°$ and angles of θ greater than 70° and less than 90°.

The greater lobes of this multilobed pattern shall occupy greater than 60% of the total solid angle of the specified envelope of radiation coverage. The lobe structure of this radiation pattern shall be sufficiently fine to provide an average lobe width of approximately 4.5° and an average null width of approximately 2.25°, at the isotropic level of this antenna system, in horizontal planes. In vertical planes, the average lobe width shall be approximately 7°, and the average null width shall be approximately 3.5°, at isotropic level.

Reason for Change and Remarks: The external configuration of the Delta wing airplane does not permit the use of a single antenna to provide the required coverage for this function. It is therefore necessary to use two or more antennas in a multiple antenna system.

14 OCT 1954

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Spec. No. MIL-A-8543** (Cont)

242 (Cont) Reason for Change and Remarks: (Cont)

At the present state of the art, satisfactory methods of multiplexing two or more antennas, at the same frequency, are limited.

Two paralleled antennas, whose patterns taken separately cover all the specified directions of radiation, can provide a radiating IFF system with a high probability of response to interrogating signals which arrive at directions within the specified coverage zones.

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Page 1 of 3

SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 247 & 248

DATE 22 May 1956

CHANGE (ECP) NO. 1126 MODEL TF-102A

REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291, dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem, dtd 31 Jan. 1956. CCN #62 MSN 7M-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-L-6730, dated 9 June 1950 - Light Equipment; Exterior, Installation of Aircraft (General Specification)

FROM:

244	3.16.8.3	Exterior Lights
	Requirement:	(1) Paragraph D-la - Wing position light assemblies shall be installed on the tips of the outer wing panel as illustrated in Figures #1 and #2. (2) Paragraph D-lc - Wing position lights shall be visible from all positions with a 90 degree angle above and below the horizontal and within a 110 degree horizontal angle as illustrated on Figures #1 and #2. (3) Paragraph D-3a - Fuselage light assemblies shall be installed midway between the nose and the tail of the aircraft but aft of the pilot's cockpit. The top light shall be directly above the bottom light and the line through these two lights shall be perpendicular to the thrust line of flight.
	Deviation:	Wing position lights to be installed in accordance with Contractor drawings subject to approval by WADC.

Reason for Change and Remarks: The Delta wing planform and the missile bay configuration does not lend itself to wing and fuselage light installations of Figures #1 and #2. Approved by AMC letter dated 27 July 1954.

TO:

244	3.16.8.3	Exterior Lights
	Requirement:	(1) Paragraph D-la - Wing position light assemblies shall be installed on the tips of the outer wing panel as illustrated in Figure #1 and #2.

AIRPLANES AFFECTED:

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Page 2 of 3

FINAL

SPECIFICATION CHANGE NOTICE

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 247 & 248 (Cont) DATE 22 May 1956

CHANGE (ECP) NO. 1126 MODEL TF-102A REVISED 20 May 1957

CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291 dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem dtd 31 Jan. 1956. CCN #62 MSN ZN-4806, dated 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

	Deviation	Paragraph	MIL-L-6730 (Cont)
TO: (Cont)		Requirement: (Cont)	(2) Paragraph D-1c - Wing position lights shall be visible from all positions with a 90 degree angle above and below the horizontal and within a 110 degree horizontal angle as illustrated on Figures #1 and #2. (3) Paragraph D-3a - Fuselage light assemblies shall be installed midway between the nose and the tail of the aircraft but aft of the pilot's cockpit. The top light shall be directly above the bottom light and the line through these two lights shall be perpendicular to the thrust line of flight.
		Deviation:	Wing position lights to be installed in accordance with Contractor drawings subject to approval by WADC.

Reason for Change and Remarks: The Delta wing planform and the missile bay configuration does not lend itself to wing and fuselage light installations of Figures #1 and #2. Approved by AMC ltr. dated 27 July 1954.

(Effective on A/C Ser. Nos. AF54-1351 thru 54-1370, 55-4032 thru 55-4059, 56-2317 thru 56-2335)

ADD:	244	3.16.8.3	Exterior Lights
		Requirement:	(1) Paragraph D-1a - Wing position light assemblies shall be installed on the tips of the outer wing panel as illustrated on Figures #1 and #2. (2) Paragraph D-1b - Color - One red port position light assembly and one green starboard position light assembly shall be installed.

AIRPLANES AFFECTED:

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SPECIFICATION CHANGE NOTICE

FINAL

SPEC NO. ZD-8-004A
FILE OPPOSITE PAGE NO. 247 & 248 (Cont) **DATE** 22 May 1956
CHANGE (ECP) NO. 1126 **MODEL** TF-102A **REVISED** 20 May 1957
CONTRACT AF33(600)-31174

AUTHORITY AND REASON FOR CHANGE: RFA #59 of CTCI Board 25-27 May 1955, Convair Ltr. 6-6291 dtd 30 Nov. 1955. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem dtd 31 Jan. 1956. CCN #62 MSN 7N-4806, dtd 29 Jan. 1957.

CHANGE

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	MIL-L-6730 (Cont)
ADD: (Cont)	Requirement: (Cont)	(3) Paragraph D-1c - Wing position lights shall be visible from all positions within a 90 degree angle above and below the horizontal and within a 110 degree horizontal angle as illustrated on Figures #1 and #2. (4) Paragraph D-2 - Tail position assemblies - D-2a, D-2a(1), D-2a(1)a, D-2a(1)b, D-2a(2), D-2a(3) and D-2c. (5) Paragraph D-3 - Fuselage Light Assemblies-D-3a, D-3b, D-3b(1), D-3c.
	Deviation:	(1) Wing position light assemblies shall be installed per Convair Proposal Drawing 8-60548. (2) One port position light assembly with forward half red and clear aft and one starboard position light assembly forward half green and aft clear shall be installed. (3) Not applicable. (4) Not applicable. (5) Not applicable.

Reason for Change and Remarks: Installation of rotating red beacon (1 each upper and lower fuselage) render fuselage and tail position lights ineffectual and unnecessary. AMC Ltr. MCPHFC(RDZSFG)1-5 WES/jem dated 31 January 1956.
(Effective on A/C Ser. Nos. AF56-2336 thru 56-2379)

AIRPLANES AFFECTED:

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6730, dated 9 June 1950 - Light Equipment; Exterior, Installation of Aircraft (General Specification)
243	3.16.8.3	Exterior Lights

Requirement: Paragraph C-2 - "When applicable, aircraft exterior lighting systems shall contain the light assemblies shown in Table III."

Paragraph D-3b - Both top and bottom fuselage lights shall be equipped with clear white glass covers as specified in Table III."

Deviation: Special lights may be installed as required and as approved by the USAF.

Reason for Change and Remarks: Aerodynamic design considerations and the configuration of the wing, tail and fuselage dictate the use of special exterior lights.

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244 3.16.8.3 Exterior Lights

Requirement: (1) Paragraph D-1a - Wing position light assemblies shall be installed on the tips of the outer wing panel as illustrated in figures #1 and #2.

(2) Paragraph D-1c - Wing position lights shall be visible from all positions within a 90 degree angle above and below the horizontal and within a 110 degree horizontal angle as illustrated on figures #1 and #2.

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SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 248 DATE 15 August 1955

CHANGE NO 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264, & 31174

AUTHORITY AND REASON FOR CHANGE: Contractor request - Ref. Convair Ltr 6-1420 dtd 3-24-55. AMC approval Ltr MCPHFC(WSCFG)1-5 RGA/js dtd 5-5-55. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

PARAGRAPH NO. CHANGE

APPENDIX II - SPEC. MIL-L-6730.

ADD: Deviation 244a

244a 3.16.8.3 Exterior Lights

Requirement: Paragraph D-2A(1)b - "The distance between centers of both tail position lights shall not exceed six inches."

Deviation: The distance between centers of both tail position lights may be greater than six inches.

Reason for Change and Remarks: 8.75" center to center spacing is required in order to prevent weakening of the aircraft structure.

AIRPLANES AFFECTED: All

BY

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation | Paragraph | Military Specification No. MIL-L-6730 (Cont)

244 (Cont)

Requirement: (3) Paragraph D-3a - Fuselage light assemblies shall be installed midway between the nose and the tail of the aircraft, but aft of the pilot cockpit. The top light shall be directly above the bottom light and the line through these two lights shall be perpendicular to the thrust line of flight.

Deviation: Wing position lights to be installed in accordance with contractor drawings subject to approval by WADC.

Reason for Change and Remarks: The Delta wing planform and the missile bay configuration does not lend itself to wing and fuselage light installations of figures #1 and #2. Approved by AMC letter dated 27 July 1954.

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245 3.16.8.3 Exterior Lights

Requirement: Paragraph D-2a (3) - Tail position lights shall not be installed where they will be subject to heat in excess of that specified in Specification AN-L-12.

Deviation: Tail position lights may be subject to a temperature of 250 degrees F, subject to WADC approval.

Reason for Change and Remarks: Locating tail position lights in an area where they would not be subject to a temperature in excess of the 160 degrees specified by AN-L-12 would result in a severe weight penalty, due to the dense structure involved. Refer to CVAC Drawing No. 8-09032 (Proposal-Tail Position Lights) submitted to USAF for approval with CVAC Ltr No. 6-3790 dated 16 August 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6730 (Cont)
246	3.16.8.3	Exterior Lights
	Requirement:	Paragraph D-2c Visibility - Tail position light assemblies shall be visible from all positions within 90 degrees above and below and right and left of the airplane fuselage thrust line when viewed from the rear.
	Deviation:	Visibility of tail position lights shall be as shown on CVAC drawing No. 8-09032 (Proposal-Tail Position Lights) submitted to USAF for approval with CVAC Ltr No. 6-3790 dated 16 August 1954 and as finally approved by WADC.

Reason for Change and Remarks: Location possible for tail position lights results in 88 1/2 degrees aft visibility in lieu of 90 degree requirement.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-C-6822(1), dated 6 October 1950 - Clamp; Mounting, 2-Inch Size Instrument - Installation of
247	3.14.3	Instrument Installation

Requirement: Figure 1 - Specifies that clamps are to be mounted 45° from vertical.

Deviation: Clamps shall be installed to obtain maximum density of instruments within each panel.

Reason for Change and Remarks: Space in the student's panel is very limited and high density instrument spacing is imperative to maintain good vision over the panels.

* * * *

248	3.14.3	Installation

Requirement: Paragraph 4.3 - "It shall be determined that the flexible tube or wire available in front of the panel when the instrument is withdrawn, is a minimum of 4 inches.

Deviation: Flexible tube, wire, etc, shall be of sufficient length to permit disconnect from the instruments prior to withdrawal from the hinged panel.

Reason for Change and Remarks: Minimum of 4 inches is not realistic on this type installation as the panels are hinged at the bottom thus requiring varied lengths of tubes, wire, etc for withdrawal and disconnect depending on the position of the instrument.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-L-6880A dated 30 Jan 1952 - Lubrication of Aircraft, General Specification for
249	3.2.10	Lubrication
	Requirement:	Paragraph 3.4.2.3 - "Fittings where required for pressure lubrication shall be in accordance with Specification MIL-F-3541 and Standards MS15000, MS15001, MS15003 and MS15006."
	Deviation:	It shall be permissible to use NAS 497 and NAS 516 flush type fittings.

Reason for Change and Remarks: In certain applications clearance problems dictates the use of NAS flush type fittings. In other applications it is more adviseable to use a press fitting rather than the screw type fitting. The NAS 497 fitting will be used until current stock is depleted which will then be replaced by the NAS 516 fitting.

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SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 252 DATE 15 August 1955

CHANGE NO 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor request - Ref Convair Ltr 6-3331 dtd 6-29-55 CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

PARAGRAPH NO. CHANGE

APPENDIX II - Spec. MIL-E-7080

ADD: Deviation 249a

249a 3.16.4 Equipment - Installation

Requirement: Paragraph 3.1.5(d) - "Protection: Protection shall be provided against moisture, water leakage, condensation, excessive heat, combustible vapors and fluids....."

Deviation: Vapor proof covers for lights mounted in the tail fairings, which are attached to the aft end of the fuselage, need not be provided.

Reason for Change and Remarks: Covers are not provided in order to utilize the cooling air passed thru the fairings to control lamp temperatures. It is the Contractor's opinion that adequate protection against accummulation of vapors is afforded these light installations by metallic shrouding of the engine. (CTCI Board of 25-27 May 1955 recommended deviation.)

AIRPLANES AFFECTED: All

BY

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FORM 6188-8

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080, dated 27 December 1950 - Electrical Equipment; Installation of Aircraft, General Specification
250	3.16.4	Equipment - Installation

Requirement: Paragraph 3.1.5 (j) - "Ventilation: Adequate ventilation shall be provided. An operating temperature range of -55°C (-67°F) to +70°C (+158°F) has been established as the goal to which the design and manufacture of electrical equipment must be directed. It is required that electrical equipment be installed in such manner that these temperature ranges will not be exceeded under normal operating conditions of the aircraft unless otherwise specified."

Deviation: Temperatures in excess of the limits specified shall be permissible under high speed flight conditions, provided that it is demonstrated that the temperature is of such short duration and of such a value that the equipment shall not be damaged.

Reason for Change and Remarks: The short duration of excess temperature makes damage to equipment extremely unlikely and the weight and compromises of design required to keep the temperature within the specified limits is not warranted. To maintain design identical to F-102A airplane.

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251	3.16.5	Wiring

Requirement: Paragraph 3.1.9 - "Wiring shall be installed in accordance with Spec. AN-W-14."

Deviation: Wiring shall be installed in accordance with Spec. MIL-W-5088.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
251 (Cont)	3.16.5	Wiring (Cont)

Reason for Change and Remarks: To specify applicable specification.

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252	3.16.4	Equipment - Installation

Requirement: (1) Paragraph 3.3.1 - Types. - Circuit breakers shall conform to Specification MIL-C-7079. Circuit breakers above 50 ampere capacity and those required for A.C. Circuits shall be approved by the Procuring Service....."

(2) Paragraph 3.3.1 - Fuses.... shall not be used unless authorized by the Procuring Service.

Deviation: (1) Circuit breakers shall conform to Specification No. MIL-C-5809 or shall be a substitute trip-free breaker approved by the USAF. These breakers shall also be used for protection of alternating current circuits.

(2) Fuses may be used for the protection of the fuel booster pump power circuits.

Reason for Change and Remarks: (1) Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF models. (2) The airplane generating system will not accept the overload characteristic of circuit breakers of the size required to protect the boost pump wiring - Fuses provide closer overload protection.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
253	3.16.4	Equipment - Installation

Requirement: Paragraph 3.3.2.1 - "Push-pull circuit breaker shall conform to Drawing AN 3161 and shall be used for circuit protection and emergency control."

Paragraph 3.3.2.2 - "Switch circuit breakers shall conform to Drawing AN 3160......"

Deviation: Push-pull breakers shall conform to Drawings MS25005 and MS25006, switch breakers shall conform to Drawings MS25003 and MS25004 or shall be a substitute trip-free breaker approved by USAF.

Reason for Change and Remarks: Trip-free breakers are preferred by USAF as indicated by new specification and MS standards and as requested on other USAF Models. To maintain design identical to F-102A airplane.

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Deviation	Paragraph	
254	3.16.7	Controls

Requirement: Paragraph 3.4.1.2 "Switches shall be installed in accordance with AND10453."

Deviation: Switches shall be installed in accordance with AND10453 wherever practicable.

Reason for Change and Remarks: Due to the limited space in the cockpit it may be necessary to space switches closer than specified.

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15 DEC

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification MIL-E-7080 (Cont)
255	3.16.7	Controls

Requirement: Paragraph 3.4.1.4 - "Space shall be provided on each switch panel, containing four or more switches for the subsequent installation of one spare switch conforming to Drawing AN3022 and one switch conforming to Draw-AN3023."

Deviation: Space may not be available to meet the above requirement.

Reason for Change and Remarks: Maximum amount of space for subsequent switch installation shall be provided. However, due to large amount of instrumentation and switches, and configuration of the cockpit, it is impractical to comply with the above requirement.

* * * *

Deviation	Paragraph	
256	3.16.11.4	Meters

Requirement: Paragraph 3.5.2 - "The installation and location of meters shall be such as to afford good visibility and to minimize effects of parallax."

Deviation: Meters shall be located such that the effects of parallax, when unavoidable, shall be toward the safe side on metered quantities, considered by the Procuring Services, to be least detrimental to operation and/or safety of the aircraft.

Reason for Change and Remarks: To maintain F-102A arrangement for student.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-E-7080 (Cont)**

257 3.16.13 Relays

Requirement: Paragraph 3.6.1 - "Relays shall conform to Specification MIL-R-6106 and the applicable AN drawings."

Deviation: As required, relays may be of a design not covered by AN drawings subject to the approval of the Procuring Agency.

Reason for Change and Remarks: Special problems on this airplane requires the use of nonstandard relays.

* * * *

258 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.7.1 - Types - Cutouts shall conform to Specification MIL-C-5026.

Paragraph 3.7.2 - Installation - Cutouts shall be installed in accordance with Drawing AN3025.

Deviation: The requirement of the above paragraph shall not apply.

Reason for Change and Remarks: The reverse current cutout function is included as a part of the D.C. control panel.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
259	3.16.4	Equipment - Installation

Requirement: Paragraph 3.8.1 - "Rheostats shall conform to Specification MIL-R-6749, and are available in various standard capacities as shown on Drawing AN3155."

Deviation: (1) It shall be permissible to use rheostats in accordance with JAN-R-19 and JAN-R-22.

(2) It shall be permissible to use Ohmite taper wound power rheostats where necessary.

Reason for Change and Remarks: (1) These rheostats are approved and can be obtained in smaller dimensions than the AN3155 rheostats, thereby conserving space in the cockpit. (2) Ohmite taper wound power rheostats are required in some installations to provide sufficient electrical capacity and to fit into available space where neither AN or JAN rheostats will completely fulfill the requirements.

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Deviation	Paragraph	
260	3.16.10.3	Fuel Nozzle Grounding Jack

Requirement: Paragraph 3.10 - Fuel nozzle grounding receptacles shall be installed in accordance with Drawing AND 10439.

Deviation: It shall be permissible to install fuel nozzle grounding receptacle less than 12 inches from the pressure refuel adapter fitting.

Reason for Change and Remarks: The space limitations and the location of receptacle makes it impossible to comply with above requirements. The location of the receptacles was approved by the F-102A Mock-up Board.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7080 (Cont)
261	3.16.10.1	External Power

Requirement: Paragraph 3.15.3 (c) "..... The external power receptacle shall not be installed in wheel wells or bomb bays."

Deviation: The external power receptacle will be located in the left hand wheel well at approximately buttock line 25.5, waterline 27.75 and station 443.3 and will be provided with pull away disconnect through a hole in the wheel well bulkhead. A second D.C. external power receptacle will be installed in the aft electronics compartment forward of station 443.3.

Reason for Change and Remarks: The configuration of this aircraft and the amount of electronic equipment installed preclude installation to the above requirement and the requirement of Paragraph 3.17.3 of Specification MIL-E-7563. The second external power receptacle will permit operation of the main landing gear while the aircraft is on jacks.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (USAF) dated 1 July 1952 - Electrical Equipment, Aircraft, Installation of (General Specification)
262	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.6.1 - "On aircraft with one generator the generator circuit shall conform to Drawing No. 49B7560. The total resistance from the "GEN" terminal of the relay switch conforming to Drawing AN3025 to the "B" terminal of the voltage regulator thence from the "A" terminal of the regulator to the "A" terminal of the generator shall not exceed 0.25 Ohm."

Deviation: The direct current generator circuit shall be of special design conforming to Convair Drawings to be submitted for WADC approval.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to improved simplified design of the direct current circuit.

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Deviation	Paragraph	
263	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.6.5 - Generator controls shall consist of one ammeter per generator, one control switch per generator, one "Generator-off" indicator light per generator, one voltage adjusting rheostat per regulator, if required, ond one voltmeter .... These controls shall be grouped together on the pilots or engineers electrical panel.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-E-7563** (Cont)

263 (Cont) 3.16.2.1 Direct Current Power Supply (Cont)

Deviation:

1. A voltmeter shall not be required.
2. An ammeter shall not be required.
3. The generator switches shall be as required by the simplified control system, and shall be subject to approval by WADC.

Reason for Change and Remarks: 1. The duration of operation and the complexity of the airplane makes provisions for reading voltage unnecessary and undersirable.

2. As approved by Cockpit Mock-Up Board 28 July 1954.

3. The simplified control system will reduce the number of operations required during an emergency.

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264 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.7.2.1 - The generator circuit protector shall be located as close as is practicable to the generator bus to reduce exposures to electrical faults and in no case shall be located more than 3 feet from the generator bus.

Deviation: Not applicable. Circuit protectors in the generator circuit shall be installed to provide adequate protection of the system, and shall be subject to approval by WADC.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the improved simplified design of the direct current circuit, and due to the fact that the feeder bus from the generator tying to the distribution bus is so short.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **Military Specification No. MIL-E-7563** (Cont)

265 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.7.3 - Distribution network.

Deviation: Not applicable.

Reason for Change and Remarks: This requirement is applicable to multi-generator installations only.

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266 3.16.2.1 Direct Current Power Supply

Requirement: Paragraph 3.8.1 - Regulator sub-base. - Direct current voltage regulators shall be mounted on a sub-base in accordance with Drawing No. BE-49C7513. The sub-base shall be installed in a horizontal position when the airplane is in a normal flight attitude.

Deviation: No regulator sub-base shall be installed.

Reason for Change and Remarks: Regulator is included as a part of the D.C. Control Panel.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
267	3.16.2.1	Direct Current Power Supply

Requirement: Paragraph 3.9.1 - Reverse current cutout shall be accessible for unhampered inspection and maintenance.

Deviation: The requirements of the above paragraph shall not apply.

Reason for Change and Remarks: The function of the reverse current cutout are included in the D.C. Control Panel.

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268	3.16.9	Ignition and Starting Control System

Requirement: Paragraph 3.10.2 Installation - For jet engine starting, the system shall consist of a split bus which will be tied to the main aircraft bus during air starts. It will be isolated during the ground starting cycle. The circuitry shall be as specified by the Procuring Agency.

Deviation: The starting control system shall be designed to the requirements of the manufacturer of the specified engine. Controls and circuitry shall be subject to WADC approval.

Reason for Change and Remarks: The requirements specified above are not applicable to this airplane due to the fact that electric starters are not used.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
269	3.16.7	Controls

Requirement: Paragraph 3.13.1 - Hermetically sealed limit switches and switch actuators, if available, shall be used on all landing gear control and all landing gear warning systems where limit switches are required.

Deviation: Limit switches in enclosed housing may be used on nose landing gear with the approval of the Procuring service.

Reasons for Change and Remarks: Hermetically sealed switches of the type required, due to extreme space limitations on the nose landing gear, are not available.

* * * *

Deviation	Paragraph	
270	3.16.11.1	Alarms

Requirement: Paragraph 3.15.1 - The landing gear indicating and warning system for all aircraft with retractable landing gear units shall consist of one AN5839 indicator in accordance with Specification MIL-I-6839 ...., and an audible signal.

Paragraph 3.15.4 - Landing Gear Warning Signal. Unless otherwise specified by the Procuring Agency, the audible signal shall consist of a Type J-2 horn in accordance with Specification No. 32462, etc.

Paragraph 3.15.5 - The landing gear warning signal shall be electrically interconnected with the landing gear indicating system, etc.

Paragraph 3.15.6 - The landing gear indicating and warning system shall be installed in accordance with Drawing No. 49B7565 and shall not be interconnected with any other circuit of the aircraft.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
270 (Cont)	3.16.11.1	Alarms (Cont)

Deviation: A landing gear warning horn is not required.

Reason for Change and Remarks: Omission of a warning horn on the previous TF-102A mock-up inspection of 5, 6 Jan. 1954 was not critized. To agree with F-102A cockpit.

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271 3.8.2.5 Retracting, Extending and Locking System

Landing Gear Indicating and Warning Systems

Requirement: Paragraph 3.15.3. - The light shall be on to illuminate the red, wheel shaped knob when any gear is not exactly consistant with the position selected by the landing gear control.

Deviation: Landing gear control knobs shall be clear translucent plastic with red light bulb, which shall cause plastic to glow red when any gear is not exactly consistant with the position selected by the landing gear control.

Reason for Change and Remarks: (a) Red plastic control knobs glow in direct sunlight, resulting in impression that light is on and gear out of position.

(b) USAF design drawing AD 26 requires that landing gear control knob be of clear translucent plastic.

(c) Approved by Mock-Up Board of 28-29 July 1954. Ref. RFA #66. (F-102A)

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
272	3.16.7.1	Power Controls

Requirement: Paragraph 3.17.3 "For interceptor type aircraft the external power receptacles shall be so installed to permit automatic release of the external power cables upon movement of the aircraft."

Deviation: Installation of external power receptacle shall be made in such a manner as to disconnect the cables by movement of the airplane in pulling away from the mooring location.

Reason for Change and Remarks: To comply with Air Force request made at the mock-up inspection.

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273	3.16.4	Equipment - Installation

Requirement: Paragraph 3.19.1 - Rheostats shall conform to Specification MIL-R-6749 and are available in various standard capacities as shown on Drawing AN3155. Special rheostats not covered by the above specification shall be selected from Specification JAN-R-22.

Paragraph 3.19.2 - Special Purpose Rheostats - Special purpose rheostats, when required, shall be installed as directed by the Procuring Agency.

Deviation: It shall be permissible to use rheostats in accordance with JAN-R-19.

Reason for Change and Remarks: These rheostats are approved and can be obtained in smaller dimensions than the AN3155 rheostats, thereby conserving space in the cockpit.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-E-7563 (Cont)
274	3.16.11.4	Meters
	Requirement:	(1) Paragraph 3.21.1 - An ammeter in accordance with specification No. MIL-A-5125 shall be installed. (2) Paragraph 3.21.2 - A direct current voltmeter in accordance with Specification No. MIL-A-6752 shall be installed.
	Deviation:	(1) A direct current ammeter shall not be required. (2) A direct current voltmeter shall not be required.

Reason for Change and Remarks: As approved by the F-102A Mock-Up Board and for weight savings.

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Deviation	Paragraph	
275	3.16.11.3	Warning Lights
	3.16.11.4	Meters
	Requirement:	Paragraph 3.21.3 - Meters shall be located on the pilot's or engineer's instrument panel and shall be grouped together and in close proximity to the generator control switch and the generator failure indicating lights.
	Deviation:	(a) The generator failure indicating light shall be located on the master warning panel. (b) The location of the meter and generator failure lights shall be subject to AF approval.

Reason for Change and Remarks: Congestion in the cockpit and the requirements for giving preference to the Fire Control System controls makes compliance impossible. As approved at cockpit Mock-Up inspection 29 July 1954. (F-102A)

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-7788, dated 28 October 1951 - Plate, Plastic Cockpit and Interior Controls Lighting
275a	3.19.2.1	Instrument Panels
	Requirement:	Paragraph 3.3.3 Color-"The background shall be black."
	Deviation:	All instrument and switch panels forward of the pilots, excluding the center and side consoles, shall have gray background (#3520).
	Reason for Change and Remarks:	Per decisions reached at F-102A Mock-Up Inspection of 28-29 July 1954, and TF-102A Nose Section Mock-Up Inspection of 28-29 Sept. 1954.

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Deviation	Paragraph	
276	3.16.8.2	Lighting - Interior
	Requirement:	Paragraph 3.7 - Mounting - "Light assemblies shall not be employed to secure plastic plates to the mounting plate. Number 4-40 washer-head screws (Blackhead) with captive nuts attached to the mounting plate, and a thin-walled bushing shall be employed to secure the plastic plate to the mounting plate. The bushing shall be designed to prevent excessive pressure on the plastic plate. Other devices may be provided when approved by the procuring agency."
	Deviation:	All plastic panels requiring more than one light assembly may be secured to the mounting plate by means of the light assembly cap and rubber light seal grommet only.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-P-7788, (Cont)
276 (Cont)	3.16.8.2	Lighting - Interior (Cont) All plastic panels requiring only one light assembly shall have at least one attachment in addition to the light assembly cap and grommet. This attachment may be a #6-32 AN526 truss head screw with captive nut attached to the back of the mounting plate.

Reason for Change and Remarks: To allow the use of light assemblies to secure the plastic light plate to the mounting plate for plastic lighting panels. This change requested by CVAC Letter 6-5918 dated 12-30-52 and approved by AMC Letter MCPPAF6 (WCOWF) HCH/bh dated 2-20-53.

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CONFIDENTIAL

APPENDIX

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military specification No. MIL-G-7818 dated 26 November 1951 - Gage, Fuel Quantity Capacitor Type, Compensated, General Specifications for
277	3.12.9.9	Quantity Gages and Flowmeters
	Requirement:	Paragraph 3.6 - "Hook-Up wire and external unshielded connector cable shall be in accordance with Specification JAN-C-76."
	Deviation:	Wire conforming to Specification MIL-W-5274A may be used for inter-component connection.

Reason for Change and Remarks: To provide uniform type wire usage in the aircraft. (AMC Ltr MCPPAF-6 (WCOWF-6) dated 3 July 1953).

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-7890 Installation of Anti "G" Suit Pressure Regulating Valve in Jet-Propelled Aircraft
278	3.19.1.2	Anti "G" Suit Valve

Requirement: Paragraph 3.3.11.1 - Pressure - The system from the air compressor of the jet engine to the pressure regulating valve shall operate at a maximum gas pressure of 125 psi.

Deviation: The system pressure will exceed 125 psi. System pressure will be 200 psi maximum.

Reason for Change and Remarks: Air from the turbo-jet engine will be led to the pressure regulating valve. The pressure of this air is compatible with pressures shown in Military Specification for the regulating valve MIL-V-9370 under paragraph 1.1.

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279	3.19.1.2	Anti "G" Suit Valve

Requirement; Paragraph 3.5.4.1 - The pressure-regulating valve shall conform to AN6538. The valve shall be located in the cockpit on the left side of the pilot. The valve shall be mounted within normal sight and reach of the pilot to facilitate selection of high or low pressure settings during flight.

Deviation; (a) The pressure regulating valves shall be in conformance with Specification MIL-V-9370.

(b) The valves shall be located on the outboard side of each pilot in the aft portion of the side console.

CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-I-7890 (Cont)
279 (Cont)	3.19.1.2	Anti "G" Suit Valve (Cont)

Reason for Change and Remarks: (a) Per ECP 13 (CCN #23) requested by USAF.

(b) Space limitations prohibits locating valve any further forward.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Military Specification No. MIL-G-7940, Gages, Fuel Quantity, Capacitor Type, Installation and Calibration
280	3.12.9.9	Quantity Gages and Flowmeters

Requirement: Paragraph 3.4.6 - ......the solderless type terminals shall be in accordance with Drawing AN659.

Deviation: Preinsulated-type terminals approved by the procuring service shall be used and shall be replaceable by AN659 terminals.

Reason for Change and Remarks: To make tank wiring consistent with balance of airplane wiring.

* * * *

Deviation	Paragraph	
281	3.12.9.9	Quantity Gages and Flowmeters

Requirement: Paragraph 3.6.2.1 - The unit containing the calibration adjustment, wherever practicable, shall be so located that the indicator is visible while adjustments are being made.

Deviation: The indicator need not be visible while adjustments are being made.

Reason for Change and Remarks: The congested condition of the cockpit precludes the possibility of location for the calibration unit therein.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memorandum Report No. MCREXP-524-3006, dated 1 December 1950 - "Design of Pressure Refueling Systems for Aircraft"
282	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.4 - "Design Criteria - Refueling." ...."Under these conditions, line sizes in the refueling systems are to be selected such that all tanks theoretically reach the full position simultaneously." Complete refueling in 3 minutes but not exceeding 600 GPM."

Deviation: No special provisions shall be made to insure that both L. H. and R. H. tanks reach full simultaneously. Tank lines shall be designed for a maximum refueling rate of 200 GPM. Complete refueling in 6 minutes but not to exceed 200 GPM.

Reason for Change and Remarks: To save weight and to prevent high pressure build-up in the tank during filling.

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283	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.5 - "Design Criteria - Defueling - The system shall provide for ground defueling of the airplane at a minimum rate of 200 GPM when suction pressure of 11 psig is applied to the airplane adapter at the inlet of the type D-1 nozzle. When suction is not available, the airplane booster pumps shall be capable of pumping all fuel out of the airplane through the adapter and nozzle but not necessarily at the above rate. Vent lines shall be adequate to allow a defueling of the maximum rate from each tank individually when the above suction is applied without experiencing any negative pressures within the tank."

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	Memo Report No. MCREXP-524-3006 (Cont)
283 (Cont)	3.12.9.13	Refueling Provisions (Cont)
	Deviation:	Defueling shall be accomplished by using booster pumps with tanks pressurized by an external source, or by tank pressurization and suction. In the latter case the defueling rate shall be not less than 45-50 GPM/side.

Reason for Change and Remarks: Considerable weight savings is realized by not complying with above in that extremely large size line would be required. Also, it is necessary that tanks be pressurized and sequenced for c. g. control.

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284	3.12.9.13	Refueling Provisions
	Requirement:	Paragraph 3.8 - "Tank Selection - It shall be possible to select any tanks for filling and conversely to avoid filling any tanks."
	Deviation:	Provisions for tanks to be filled selectively shall not be required.

Reason for Change and Remarks: Fuel from tanks is used in a specific sequence for c.g. control, conversely tanks are filled in the reverse sequence.

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285	3.12.9.13	Refueling Provisions
	Requirement:	Paragraph 3.9 - "Fuel Shut-Off Provisions - For airplanes with provisions for ground refueling only, at least one of the shut-off devices shall be of the "fail closed" design.

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENT

Deviation	Paragraph	Memo Report No. MCREXP-524-3006 (Cont)
285 (Cont)	3.12.9.13	Refueling Provisions (Cont)

Deviation: Provisions for "fail closed" control valve shall not be required.

Reason for Change and Remarks: The vent and fuel tank pressure relief systems are adequate to prevent excessive pressures in the wing if the shut-off or pilot valves fail.

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286	3.12.9.13	Refueling Provisions

Requirement: Paragraph 3.14 - "Tank-Filler Caps - The requirements for a pressure refueling system shall in no way delete existing requirements for normal tank filler caps."

Deviation: Gravity filling requirements shall not be incorporated.

Reason for Change and Remarks: Main fuel tanks may be filled by pressure refueling, (single point) only. This is as established through correspondence between CVAC and WADC. (Ref. Convair ltr 6-3490 of 2 July 1952.)

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	AND 10064 Fittings - Installation of Flared Tube, Straight Threaded Connections, dated 16 May 1949
287	3.2.11	Standard Parts

Requirement: Installation as described by (AND 10064) is required by MIL-H-5440 and other system specifications. The installation requires one (1) washer placed between the body of the fitting and the bulkhead or bracket in which it is installed.

Deviation: It shall be permissible to use additional washers between the bulkhead or bracket and the AN 924 nut where specified on engineering drawings.

Reason for Change and Remarks: To prevent chafing of bulkhead or bracket surfaces when tightening the nut.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	ANA Bulletin 386 Recommended Guided for Location and Actuation of Pilot Controls, dated 15 November 1949.
288	3.19.2.3	Check-Off List

Requirement: Paragraph 2.1.1 - (a) Location - The landing check-off list will be located on the left and the take-off check list will be located on the right of the instrument panel or adjacent thereto.

(b) Comments - A landing check-off list and a take-off check off list are primary requirements, etc. etc.

Deviation: (a) and (b) Landing and take-off check-off lists shall be combined in one unit and said unit shall be located as approved by Mock-Up Inspectors.

Reason for Change and Remarks: Approved by Mock-Up Board of 28-29 Sept. 1954.

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289	3.10.3	Trim Control

Requirement: Paragraph 2.1.6 - (a) Location - For electrically operated trim tabs - The trim tab control location shall be immediately aft of power control or on top of the aft portion of the control stick grip.

Deviation: Rudder trim switch shall be located on the utility switch panel which is located at centerline of airplane below main instrument panel.

Reason for Change and Remarks: To maintain F-102A arrangement.

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CONFIDENTIAL

APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation **Paragraph** **ANA Bulletin 386 (Cont)**

290 3.7.1.3.4 Emergency Canopy Release Control

Requirement: Paragraph 2.1.19 - (a) Location - The emergency canopy release control shall be operated by the normal canopy control.

(b) Actuation - The emergency or jettison position of the canopy control shall be aft of the open position of the canopy control, but the movement from normal canopy control open position to the emergency or jettison position shall be through a gate stop.

Deviation: (a) and (b) - The emergency canopy release control shall be separate from the normal canopy release control.

Reason for Change and Remarks: Approval by F-102A mock-up Board of 28-29 July 1954. Ref. RFA #66.

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291 3.19.2.2 Map Stowage

Requirement: Paragraph 2.9.7 - (a) Location - The map stowage location shall be on the right side.

Deviation: (a) Map stowage shall be between the two pilots.

Reason for Change and Remarks: For accessibility to each pilot. Approved by Mock-Up Board of 28-29 Sept. 1954.

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APPENDIX II

DEVIATIONS FROM APPLICABLE AIR FORCE REQUIREMENTS

Deviation	Paragraph	ANA Bulletin 386 (Cont)
292	3.20.1	Air Conditioning
	Requirement:	Paragraph 2.10.2 - (a) Location - The pressure cabin control lever and the temperature control switch shall be located on the right console forward. (b) Actuation - The control motion for the pressure cabin control lever shall be forward for pressure cabin and aft for dump and ram air. The control for the temperature control switch shall be clockwise for increase.
	Deviation:	(a) The pressure cabin control shall be a switch in lieu of a lever and shall be located on the students left hand auxiliary panel forward of and above the left console. The temperature control switch shall be located on the utility switch panel which is located at centerline of students position below his instrument panel. (b) The control motion for the pressure cabin control switch shall be up for pressure cabin and down for dump and ram air.

Reason for Change and Remarks: To maintain F-102A arrangement.

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293	3.7.1.3.4	Canopy Control
	Requirement:	Location - The canopy control shall be located on the left side forward and as high as possible.
	Deviation:	Canopy control handle to be in right lower corner of student's instrument panel, as shown in mock-up.

Reason for Change and Remarks: To maintain F-102A arrangement.

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Page 1 of 2

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 280

DATE 15 February 1956

CHANGE (ECP) NO. 1127 MODEL TF-102A

REVISED 26 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested. Cataloging and Standardization Div. Conference of 7-9 Feb. 1956. Convair Ltr. 6-7071 dtd 1-3-56. CCN #61 MSN 6N-2879 dtd 1-18-56, CCN #26 MSN 6N-4345 dtd 1-30-56 & CCN #4 MSN 6N-6174 dtd 5-10-56.

CHANGE

DELETE:

* APPENDIX III - A

The following details and assemblies shall be interchangeable within the definition of Specification AN-I-21

TF-102A INTERCHANGEABILITY LIST

1. Elevon assembly
2. Wing tip assembly
3. Wing leading edge assembly except stub assembly
4. Rudder assembly
5. Vertical stabilizer tip assembly
6. Vertical stabilizer leading edge except stub assembly
7. Fuselage tail cone assembly
8. Fuselage nose radome assembly
9. Speed brake assembly
10. Windshield and canopy transparent panel assemblies
11. Main landing gear assembly and removable components of main landing gear assembly
12. Nose landing gear assembly and removable components of nose landing gear assembly
13. Power plant installation (quick-change feature) (power plant assy)
14. Engine air intake ducts which are not integral with fuselage structure
15. Rocket and missile displacing gear mechanism (not missile bay doors)
16. Ejection seat assembly

AIRPLANES AFFECTED:

BY W. H. Young Jr

APPROVED BY

FORM 618C - 2

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 280 (Cont) DATE 15 February 1956

CHANGE (ECP) NO. 1127 MODEL TF-102A REVISED 26 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested. Cataloging and Standardization Div. Conference of 7-9 Feb. 1956. Convair Ltr. 6-7071 dtd 1-3-56. CCN #61 MSN 6N-2879 dtd 1-18-56, CCN #26 MSN 6N-4345, dtd 1-30-56 & CCN #4 MSN 6N-6174 dtd 5-10-56.

CHANGE

*APPENDIX III - A (Cont)

17. Control stick assembly (stick and grip assembly - not including yoke arrangement)

18. Rudder and brake pedal assembly

19. Control system parts and assemblies such as bellcranks, bellcrank assemblies, torque tube assemblies, control arms, walking beams, push-pull rods assemblies, shaft assemblies and similar related parts (except those that are required to be attached by taper pins, roll-pins, or rivets, or where permissible tolerance dictate matched drilling or reaming)

20. Temperature regulators

21. Pressure regulators

22. Intercoolers

23. Hydraulic and high pressure pneumatic system units (exclusive of tubing, tubing assemblies and tubing mounting parts)

24. Structural access doors (except those made of sheet metal capable of being trimmed to fit at installation with hand tools)

25. Provisions for mounting all GFAE

26. Instrument panel assembly

27. Cockpit console panels (individual panel assemblies on top of side and center consoles only)

28. Rocket packages

* Effective on A/C Ser. Nos. AF54-1351 thru 56-2379.

AIRPLANES AFFECTED:

BY W. H. Young

APPROVED BY

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CONVAIR
A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 280 DATE 15 August 1955

CHANGE NO. 1038 MODEL TF-102A REVISED 12-20-55

CONTRACT AF33(600)-23903, -29264

AUTHORITY AND REASON FOR CHANGE: Contractors Request per Convair Ltr. 6-707 dated 18 Feb 1955, and approved by AMC per ltr. MCPHFC(WCSFG/1-2) HGA/ch dated 9 May 1955. CCN #6N-3031(204) CCN #6N-3032(55) CCN #6N-3033(24) CCN #6N-3034(2).

APPENDIX III-A

(Interchangeability List)

Change Item 19 to read as follows:

"Control system parts and assemblies such as bellcranks, bellcrank assemblies, torque tube assemblies, control arms, walking beams push-pull rods assemblies, shaft assemblies and similar related parts (except those that are required to be attached by taper pins, roll-pins, or rivets, or where permissible tolerance dictate matched drilling or reaming)."

AIRPLANES AFFECTED: All

BY

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APPENDIX III - A

The following details and assemblies shall be interchangeable within the definition of Specification AN-I-21

TF-102A INTERCHANGEABILITY LIST

1. Elevon assembly
2. Wing tip assembly
3. Wing leading edge assembly except stub assembly
4. Rudder assembly
5. Vertical stabilizer tip assembly
6. Vertical stabilizer leading dege except stub assembly
7. Fuselage tail cone assembly
8. Fuselage nose radome assembly
9. Speed brake assembly
10. Windshield and canopy transparent panel assemblies
11. Main landing gear assembly and removable components of main landing gear assembly
12. Nose landing gear assembly and removable components of nose landing gear assembly
13. Power plant installation (quick-change feature) (power plant assy)
14. Engine air intake ducts which are not integral with fuselage structure
15. Rocket and missile displacing gear mechanism (not missile bay doors)
16. Ejection seat assembly
17. Control stick assembly (stick and grip assembly - not including yoke arrangement)
18. Rudder and brake pedal assembly
19. Control system parts such as bellcranks, control arms, walking beams, push-pull rods, eccentric sheaves, shafts and similar related parts. (Except those that are required to be attached by taper pins or rivets, or where permissible tolerance dictates matched drilling or reaming.)
20. Temperature regulators
21. Pressure regulators
22. Intercoolers
23. Hydraulic and high pressure pneumatic system units (exclusive of tubing, tubing assemblies and tubing mounting parts)
24. Structural access doors (except those made of sheet metal capable of being trimmed to fit at installation with hand tools)
25. Provisions for mounting all GFAE
26. Instrument panel assembly
27. Cockpit console panels (individual panel assemblies on top of side and center consoles only)
28. Rocket packages

CONVAIR
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SAN DIEGO, CALIFORNIA

Page 1 of 2

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

FINAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 281

DATE 15 February 1956

CHANGE (ECP) NO. 1127 MODEL TF-102A

REVISED 26 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested. Cataloging and Standarization Div. Conference of 7-9 Feb. 1956. Convair Ltr. 6-7071 dtd 1-3-56. CCN #61 MSN 6N-2879 dtd 1-18-56, CCN #26 MSN 6N-4345, dtd 1-30-56 & CCN #4 MSN 6N-6174 dtd 5-10-56.

CHANGE

DELETE:
*APPENDIX III - B

The following details and assemblies shall be replaceable within the definition of Specification AN-I-21.

TF-102A REPLACEABILITY LIST

	ITEM	REASON FOR NOT BEING INTERCHANGEABLE
1.	Wing Assembly	Matched drilling required for wing-to-fuselage attach angle
2.	Armament Bay Doors	Skin and hinge trim at installation
3.	Main Alighting Gear Closure Doors	Skin trim at installation
4.	Nose Alighting Gear Closure Doors	Skin trim at installation
5.	Fairings	
6.	Control Horns, masts and brackets where attached by rivets	Matched drilling required on installation
7.	Inspection doors unstressed	Skin trim and drill at installation
8.	Structural access doors made of sheet metal and capable of being trimmed at installation with hand tools	Interchangeable with respect to attach points, Skin trim at installation
9.	Stub assembly - vertical stabilizer leading edge	Variation in attach holes. Match drilling required with respect to drag angle
10.	Stub assembly - Wing Leading edge	Variation in attach holes. Match drilling required with respect to drag angle.

AIRPLANES AFFECTED:

BY W. A. Young

APPROVED BY

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SAN DIEGO, CALIFORNIA

Page 2 of 2

FINAL

SPECIFICATION CHANGE NOTICE
CONFIDENTIAL

SPEC NO. ZD-8-004A

FILE OPPOSITE PAGE NO. 281 (Cont)

DATE 15 February 1956

CHANGE (ECP) NO. 1127

MODEL TF-102A

REVISED 26 October 1956

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: AMC requested. Cataloging and Standardization Div. Conference of 7-9 Feb. 1956. Convair Ltr. 6-7071 dtd 1-3-56. CCN #61 MSN 6N-2879 dtd 1-18-56, CCN #26 MSN 6N-4345 dtd 1-30-56, CCN #4 MSN 6N-6174 dtd 5-10-56

CHANGE

APPENDIX III - B (Cont)

11.	Fuselage Movable Canopy Assembly	Interchangeable with respect to contour, latches and hinge points. Skin trim at installation

* Effective on A/C Ser. Nos. AF54-1351 thru 56-2379.

AIRPLANES AFFECTED:

BY W. A. Young Jr

APPROVED BY

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A DIVISION OF GENERAL DYNAMICS CORPORATION
SAN DIEGO, CALIFORNIA

SPECIFICATION CHANGE NOTICE

CONFIDENTIAL

SPEC. NO. ZD-8-004A

FILE OPP. PG. NO. 281 **DATE** 15 August 1955

CHANGE NO. 1038 **MODEL** TF-102A **REVISED** 12-20-55

CONTRACT AF33(600)-23903, -29264 & -31174

AUTHORITY AND REASON FOR CHANGE: Contractor's Request per Convair Ltr 6-707 dated 18 Feb 1955, and approved by AMC per Ltr. MCPHFC(WCSFG/1-2) RGA/eh dated 9 May 1955. CCN #6N-3031(204) CCN #6N-3032(55) CCN # 6N-3033(24) CCN #6N-3034(2).

APPENDIX III-B
(Replaceability List)

Change Item 6 to read as follows:

"Control Horns, masts and brackets where attached by rivets"

Reason for not being interchangeable: "Matched drilling required on installation."

CC[illegible]-3031(20[illegible]) CC[illegible]-3032([illegible]) CC[illegible]

AIRPLANES AFFECTED: CC.All[illegible]-303[illegible](2). **BY**

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APPENDIX III-B

The following details and assemblies shall be replaceable within the definition of Specification AN-I-21.

TF-102A REPLACEABILITY LIST

	ITEM	REASON FOR NOT BEING INTERCHANGEABLE
1.	Wing Assembly	Match drilling required for wing-to-fuselage attach angle.
2.	Armament Bay Doors	Skin and hinge trim at installation
3.	Main Alighting Gear Closure Doors	Skin trim at installation
4.	Nose Alighting Gear Closure Doors	Skin trim at installation
5.	Fairings	
6.	Control horns, masts, brackets, bellcranks, control arms, walking beams, push-pull rods, eccentric sheaves, shafts and similar related parts that are required to be attached by taper pins or rivets, or where permissible tolerances dictate matched drilling or reaming.	
7.	Inspection doors unstressed.	Skin trim and drill at installation.
8.	Structural access doors made of sheet metal and capable of being trimmed at installation with hand tools	Interchangeable with respect to attach points, Skin trim at installation.
9.	Stub assembly - vertical stabilizer leading edge	Variation in attach holes. Match drilling required with respect to drag angle.
10.	Stub assembly - Wing Leading Edge	Variation in attach holes. Match drilling required with respect to drag angle.
11.	Fuselage Movable Canopy Assembly	Interchangeable with respect to contour, latches and hinge points. Skin trim at installation.